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An Experimental-Critical Study of the Problem of Grading and Promotion

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The Psychological Clinic

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By W. FRANKLIN JONES, PH.D.,

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PART I.—THE FORMAL ASPECT OF THE PROBLEM.

Introduction.

The old ungraded school, whatever else may be said about it, had one splendid feature that the graded school has never attained; namely, its instruction was individualistic. On the other hand, the graded school has come to us as an administrative necessity; its economic aspect is unmistakable, and it has made possible the education of the masses. Once with us, we were quick to discern that the graded school was a mighty, social institution. We have seen that the members of its epitomized society render valuable service to others at the very time they are working for themselves; that its recitation is a veritable mental clearing house in which values are exchanged, each sees through the eyes of others, and the individual is taught by forty teachers instead of by one. The principle of highest value in the graded school is thus held to be the social principle; and this, whatever else may come to the school, we are not now willing to sacrifice. But if, while conserving the social, we can in some way bring back the valuable individualistic principle of the old, ungraded school, then we shall have realized, perhaps, the ideal on that formal administrative side which we call grading the school.

Within this problem of grading, we have to recognize a subproblem. The school grade is not static; but the moment instructions begins, this feebly cohering mass begins to disintegrate, one student forging ahead and another lagging behind. This subproblem which we have to meet is the problem of re-adjustment; that is, promotion, positive and negative.

Students of educational administration have been at work with this problem of grading and promotion; but unfortunately in this, as in other fields of education, we have been offered an array

of opinions, rather than facts. We have had but few investigations that have given us facts, and these it seems have been of the extensive rather than of the intensive type.

It is a significant fact that investigators who have dealt with the different aspects of the problem of grading and promotion have apparently never failed to find that the more deeply one enters into the study of this problem, the more one is aware of the needs of individual and intensive studies. Thus Thorndike¹ notes that "the school histories of individual pupils are the proper data" for measuring the unequal lengths of the different grades; and he points out several "inadequacies" in his own extensive study. Ayres² notes that "grade distribution is the result of such diverse elements, that without the most careful analysis, conclusions as to any of these elements are liable to go astray."

The fact is, we need many investigations of each type before we can hope for a definite solution of the serious problem of grading and promotion. We shall have to have a multitude of facts that call for further study. With no thought therefore of being able to settle the matter, it is the aim in the present study to approach the subject of grading and promotion from the intensive standpoint, with the hope of being able to throw some light upon the problem.

STUDY No. 1.

The immediate aim of this study may be stated in the form of three questions:

1. What portion of the failures to carry regular school work under the lockstep³ system is due to incapacity?
2. What portion of the elimination from school under this system is due to incapacity?
3. What light does this study throw upon the problem of grading and promotion?

Material.

One of the public schools under my supervision in Illinois presented what seemed to be a favorable type for this study. The situation was not too complex. There were eight grades in the building, averaging a little less than forty students per grade,⁴ the largest enrolment in any grade being forty-six, and the lowest, thirty-two. Each grade was carried in two sections, working rather close together (lockstep). The eight teachers were well

¹THE PSYCHOLOGICAL CLINIC, Vol. III, page 232.

²THE PSYCHOLOGICAL CLINIC, Vol. II, page 133.

³Proceedings of the N. E. A., 1903, pp. 408-412.

⁴Cf. THE PSYCHOLOGICAL CLINIC, Vol. III, pp. 206-212.

acquainted with their work, no one of them having served less than three years at her post. My own acquaintance with nearly every family represented in the school, was not my least encouragement. Finally, every child of school age in the district was in attendance; for this city, not unlike what Cornman⁵ says of Boston, could "boast" that it had "a seat for every child able to attend," and the school law enforced attendance.

Method.

In the choice of method, I met two apparently opposing demands:

1. It was evident that in assuming to pass upon a student's capacity to do the required work under given conditions, I must have something more than "examinations." I must come into close touch with him, see him work, converse with him, pry into his mind and into his methods of study; in short, I must make an intensive study of the student.

2. I could not make an adequately intensive study of all the students in this school, yet I must have an adequate measure of class abilities under the existing conditions.

The plan adopted was as follows:

The investigation covered a period of three years. As soon as work was fairly under way in the fall, the classes were tested for class average in each subject. Work was assigned at the beginning of test periods and the class closely supervised to see that all "tried". One test of from fifteen to thirty minutes was given in each of the major subjects each day. The total number of class tests ranged from five to twenty per subject in each grade. The object of these class tests was twofold:

1. To find the average ability of the class in each subject, working under the usual conditions.

2. To locate doubtful students.

As soon as it appeared that a student could not do seventy-five per cent as much work in a given time as the average of his class, he was made the subject of special study. All tests were on current school work. In the private tests, the student was first examined to see if his "back work" was sufficiently sound to warrant his classification. If so, he was then tested on the work the class was tested on, but which he had either failed in or had not reached in the class test. The object of the private tests, to repeat in part, was to determine:

1. *Classification.*—Whether or not the student was in the best place the school could offer him.

2. Ability to maintain rate of work shown in class tests.
3. Validity of often meager showing made in class tests.

4. *Personal characteristics at work.*—Methods of attacking work, grasp of subject, industry, persistence, conservation of time, etc. Similar though less searching tests were given during the year, as new subjects (*i. e.* division, fractions, etc.) were reached.

It must be remembered that the object was to test the student's ability at the time to do the work the class was regularly engaged in, whatever that work was, under the usual conditions of study, teaching, and so on. Since it is impracticable to do more than indicate the nature of these numerous tests, I give herewith one test in each of the school subjects (major). These tests are picked at random, except as noted later.

Test in Reading—First Grade.

(Class of 18)

Material Used.—Story of the fox, pages 108-109, in the first book of the "Stepping Stones to Literature" series, published by Silver Burdett & Co. No one in the class had ever seen the lesson before.

Instructions to Class.—"Study it as you usually do your reading lesson. As soon as you know what it says, close the book quietly and fold your hands." (Time was recorded for each student. Each was then questioned in private for the thought, and remanded if necessary, counting additional time.)

Test in Arithmetic—Fourth Grade.

(Class of 21)

Material Used.—Problems on page 111 of Book I, Werner Arithmetic, published by the American Book Company.

Instructions to Class.—"Take the problems in order, and work as many of them as you can before time is called. Only those which you get right will be counted." (These students had been taught during a test to leave problems which they could not work out without losing considerable time.)

(In handling problems of a series growing gradually more difficult, the plan commonly followed was that of having the students first work through the even-numbered problems, then through the odd numbered.) The results of this test are as follows:

1	28	3	17
1	24	3	16
1	21	2	14
2	20	2	11
3	19	1	2
2	18		

Class average, 17 problems.

(This test was not picked at random, but selected for reasons shown later.)

Test in Grammar—Seventh Grade.

(15 students)

Material.—Fifteen typewritten slips of paper containing ten sentences each.

Instructions to Class.—“Underscore once the logical subject, and twice the logical predicate, in each of the ten sentences. Raise the hand when finished.”

The ten sentences were as follows:

1. The old man was often in want of the necessities of life.
2. The book of which you spoke is not to be found in the library.
3. He did not understand the assignment.
4. The train which was expected at ten o'clock did not arrive till eleven.
5. How many men were killed in the battle?
6. Those of you who can answer my question, raise the hand.
7. “Thou shalt not bear false witness against thy neighbor.”
8. I shall probably reach home before dark.
9. Several men died of fever in the ship.
10. Are you not trying to do your work well?

(Time recorded for each student. Rating combined accuracy and time.)

Test in Geography—Eighth Grade.

(15 students)

Material.—Physical and relief maps of Africa.

Instructions to Class.—Recalling the prevailing winds, see how many facts you can discover that go to show why the Nile, the Sahara, and the Congo are what they are and where they are.

(This class had done similar work with other continents. Time was called in twenty minutes. No one had finished.)

Test in History—Fifth Grade.

(22 students)

Material.—The teacher narrated that portion of the story of Joliet and Marquette which may be found in the two paragraphs

extending from the bottom of page 61 to the middle of page 63, in McMurry's "Pioneer History Stories of the Mississippi Valley," published by Macmillan Company.

Questions.—The students were then asked the questions given below. The answer to one question was written before the next question was asked. No other time limit.

1. What time of the year did Joliet and Marquette reach the Mississippi?
2. Did they go up or down the Mississippi?
3. What did they see that reminded them of the Indian story?
4. What did they see on the prairies?
5. What did they do to avoid dangers of night attacks of the savages?
6. How did they happen to find the Indian village?
7. How did they attract the attention of the Indians of the village?
8. What did the chief Indians first do in receiving the Frenchmen?
9. What led Joliet and Marquette to think the Indians must be friendly?
10. What name did the Indians claim for their tribe?
11. In what strange way did the Chief honor the Frenchmen?
12. How did the Frenchmen learn of the "Great Chief?"
13. In what strange way did the "Great Chief" receive them?
14. How were the Frenchmen able to talk with the Indians?
15. What did they tell the "Great Chief?"
16. What reply did the "Great Chief" make?

These questions were framed with the design of calling out short, definite answers that would be either right or wrong, with as little mixing of right and wrong as possible.

The Table of Statistics.

The marks recorded in the table that follows are in terms of the class average. To illustrate, the last student in the arithmetic test recorded above, worked two problems. This is about 12 per cent of the seventeen problems which the class averaged. This student's record for this test is thus 88 per cent below the class average, that is—88.

Any student who in the class tests had demonstrated his ability to do at least 75 per cent as much acceptable work as the class averaged, was counted competent to carry that subject and he was not held for private tests. Students failing to do this 75 per cent were held for private work. In the final rating for ca-

pacity to carry regular work, the amount of additional (outside) time required by a given student to do the work shown by the class average, was calculated. If this "extra time" exceeded one-half of the actual school study periods for these major studies, then the student was regarded incompetent to do the regular work. (Divested of accessories, these actual study periods in school footed up two and a half hours, approximately, in the seventh and eighth grades, and decreased through the grades to less than an hour in the lowest primary grade. Attention is called to the fact that the "outside" study thus meant over an hour in the upper grades; this, too, in solid study at the probably unusual rate shown in the class tests.)

The time absent previous to elimination is recorded in each case where unavoidable absence was the cause of the failure to carry work and meet promotion with the class. Students found competent, but unwilling to do the work, are marked "indolent."

In dealing with the difficult question of actual cause of elimination, my own wide acquaintance with the patrons seemed to be my license. I had no method, unless it was that of pursuing the case. When I reached a point where the actual cause seemed no longer a matter of question, I ceased pursuit. In order to illustrate my procedure, I will deal with a few typical cases in the higher grades where the actual cause is likely to be more carefully concealed.

Number 89 in the table was a fourteen-year-old girl. The reason she gave her teacher for leaving school was, "Too much work at home." This case was first attacked through the girl's intimate associates, and it was found that she had given them the same reason. The girl's father was next approached. He indignantly denied that the girl was worked enough at home to interfere with her school work, and he stated that the girl had pleaded for permission to leave school because she could not keep up with her class. Fearing that the father might be in error as to a reasonable quantity of work, or even that he might be attempting to deceive, one of the high school teachers who lived near this family was asked to call at the home and cautiously investigate. This was done, and the teacher reported that there was no overwork. I then requested the girl to call at my office, and when she came she admitted with shame that she had not given the teacher the real reason. "I didn't want my teacher and everybody to know I was dumb," was her confession. Since our records justified this reason, I ceased pursuit.

Number 97 was a sixteen-year-old girl. Her father came to

withdraw her from attendance because "she is too lazy for any use in school." This man was an alderman, high spirited, and I feared he was concealing what he really knew. The girl had come all the way up through our grades, and the teachers were called on for opinions. There was not one of the teachers who thought the girl actually lazy, but the consensus of opinion was that she was only "a fair worker and very dull in arithmetic." The girl was then called and asked for a reason. She hesitatingly said, "My father says I am too lazy." "But what do you say?" was asked. In sobs and in fragments came the answer, "I have tried hard to do my work, but you know I can't." I felt that I did know this, and I gave my assent.

Number 90 was a thirteen-year-old boy, native born but of foreign parentage. He had been a good worker in school until the last year. He left in January, at the end of the sixteenth week of school. He gave "work" as his reason for leaving. The coincident facts were noted that he left school just as soon as the sixteen weeks school law at that time permitted, and that he would be fourteen before the beginning of another school year. Our records showed that this was the third instance of the kind in this family. The boy really went to work in his brother's harness shop, and remained at work. The brother stated that the family felt that the boy knew enough to enable him to "make his way." It was thus not only evident that the boy actually left school to go to work, but also that this knowledge that he was to leave was the cause of his failure to carry his school work. (This case coincides with Falkner's⁶ findings that some students "anticipate the fourteenth birthday.")

Under the heading, "Reasons for failure," in the table, are given reasons other than that of incapacity. Records of students whose failures were due to absence, are not given, since they would only complicate the records needed. The list contains the names of the entire number of students who failed to carry school work during one or more of the three years covered by the investigation.

Absence that could well have been avoided is marked by the abbreviation "Av." The number after the word "Absence" indicates the approximate number of weeks. Ages in all cases are computed up to the first of January of the school year in which the failure occurred.

(Since the number of eliminations from death would not here alter conclusions, they are not thrown out. Strange though it

may seem, the school was blamed (by the girl's father) for the case of child-marriage; hence the case is allowed to stand.)

All told, forty-nine out of the one hundred and two failures were due to incapacity; and twenty-seven out of fifty-eight alleged reasons for leaving school agreed with the actual facts.

Significant Facts Revealed by This Table of Results.

1. About one-half of the failures to carry work in this school under the lockstep system were due to incapacity to do the required work. (49 out of 102.)
2. About one-third of all eliminations were due to incapacity to do the work under existing conditions. (19 out of 58.)
3. Over one-half of all eliminations came from students who had failed to carry their work. (34 out of 58).
4. One out of three failing students left school. (34 out of 102.)
5. One out of thirty-three non-failing students left school. (24 out of 837.)
6. Alleged reasons for leaving school were about as often false as true. (27 out of 58.)

Comparison of Results with Those of Other Investigations.

We may now compare the results of this study with those of some of the recent investigations of the extensive types (I know of no similar investigations of the intensive type; none, at least, have been published).

Ayres⁷ found that on the average, death eliminates each year about three-tenths of one per cent of the students enrolled (27 out of 1000 in eight years). My tables show four-tenths of one per cent (4 out of an average enrolment of 313 for three years). The difference is slight, but the enrolment upon which my figures are based is too small to offer anything more than a mere comparison in this respect. Ayres found that "for each 1000 children in the first grade, no more than 871" reach the eighth grade. My study shows 803 out of 1000 (122 enrolled in the first grade and 98 in the eighth). Neither my own figures nor those of Ayres are quite reliable here, since they are not based on the history of individual cases. Ayres found that one-fifth of the students enrolled fail to be promoted, Thorndike⁸ found one-seventh, and my figures show one-ninth. (102 out of 939). As to the number of students leaving school, the results of Ayres and of Thorndike are hardly comparable with my own, since the recent compulsory school attendance law of Illinois holds the child in school until he is sixteen years

Girls	Boys	Age. Years. Months.	Reading or English	Arithmetic.	Language or Grammar.	Reasons for failure other than incapacity. (Omissions and "Defective" mean incompetent.)	Eliminated.	Alleged reason for leaving.	Actual reason for leaving.
1	1st grade	6-7	-28	-40	-38	Absence..... 4			
2		8-6				Absence..... 12			
3		6-6				Indolence.			
4		6-7	-5	14	-7				
5		6-5	-60		-41				
6		6-8				Absence Av.			
7		7-6	-35	-15	4	Absence..... 3			
		8 7-1	-78	-12	-38	(Nervous)			
		9 6-5				Absence Av.			
10		7-2	-50	-21	-34				
11		7-1	-37	-26	-43				
12		13-6	-34	-23	-51				
13		6-8				Absence Av.			
14		6-5	-37	-44	-23				
	2nd grade								
15		9-5	-51	-20	-38				
16		7-7				Absence..... 8			
17		7-9				Absence..... 11			
18		8-0	-35	-21	-54				
19		8-1				Absence Av.			
20		7-5	3	12	-5	Mind Wanderer.			
21		7-7				Absence..... 7			
22		14-1	-67	-16	-38				
23		7-6	-43	-18	-58				
24		7-5	7	-3	-12	Mind Wanderer.			
	3rd grade								
25		8-5	-14	-78	-16	-26			
26		9-1				Absence Av.			
27		8-9	-43	-12	-57	-30			
28		8-6				Absence..... 5			
29		8-8				Absence..... 9			
30		8-4	-2	-15	-9	Indolence.			
31		8-7	-37	-40	-39	Defective.			
32		9-1				Absence..... 4			
33		11-1				Absence Av.....			
34		9-4	-18	-45	-29	-47			
35		10-2	-64	-24	-36	-14			
	4th grade					Defective.....			
36		11-6	10	-18	4	-15	-11		
						Indolence.....			
37		9-5				Absence..... 5			
38		9-4				Absence Av.			
39		10-1				Absence Av.			
40		10-2	-32	-45	-19	-44	-32		
41		13-4				Absence Av.....			
						Elim.....	Knows enough...	Inappre.	
42		13-1	-28	-53	-22	-39	-30	Work.....	Incap.
43		9-5	-30	-37	-25	-30	-48		
44		9-5	80	88*	78	56	69		
45		10-1	-45	-32	-22				
46		9-6				Absence..... 14			
47		9-8	-23	-55	-50	-31	-12	Defective.	
		9-5				Absence..... 6			
	5th grade					Absence..... 9			
49		12-7	-24	-32	-50	-12	-55		
						Elim.....	Try St. Al- bans.....	Incap.	
50		10-5	-20	-28	-19	-3	-30		
51		10-6	-20	-28	-35	-32	-49	Death.	
52		12-8	-38	-35	-32	-41	-18		
53		11-1	-15		-20	-41	9	Indolence.	
54		10-6	-18	-50	-41	-34	-32		
55		13-4	-29	-38	-22	-40	-41		
						Elim.....	Can't get along with teacher.		
56		10-4				Absence..... 6			
57		10-9	3	-14	-12	-43	8	Indolence.	
58		13-8	-26	-26	-31	-47	-40		
						Elim.....	Needed at home....	Incap.	
59		10-9				Absence..... 7			
60		11-1	-8	-55	-13	-55	-42	*	
61		10-6				Absence..... 8			
62		10-8	4	-24	-10	-32	-19	Indolence.	
63		12-7	-51	-29	-34	-14	-42		

* Record of single test.

Girls.	Boys.	Age. Years, Months.	Reading or English.	Arithmetic.	Language or Grammar.	Reasons for failure other than incapacity (Omissions and "Defective" means incompetent.)	Eliminated.	Alleged reason for leaving.	Actual reason for leaving.
		6th grade 14—6	-32	-20	-38	-40	-39		
64									
65	11—7	..	-57	-22	-33	-21	Absence	7	Incap.
66	13—1	-39	-21	-17	-13	-20	Indolence,	Work	Work.
67	11—6	6					Absence Av.	Work	Work.
68	13—7	..					Absence Av.	Work	Work.
69	13—5	..					Can't keep up	Incap.	Incap.
70	14—1	-30	-29	-45	-41	-29			
71	11—6	..	St. Vitus	-43	-23	-41	Absence	4	
72	13—1	-17					Absence Av.	Work	Incap.
73	11—5	..							
74	11—8	-20	-41	-34	-32	-46			
75	14—1	-24	-53	-30	-38	-24			
		7th grade 14—0							
76	-12	38	-5	-23	-14	Indolence	Elim	Won't work in school, t	
77	12—6	-11	-54	-18	-36	-43			
78	13—2	-8	4	-15	-24	Indolence	Elim	Work	Work.
79	12—8	-40	-54	-48	-28				
80	14—3	-41	1	-55	-47	-30			
81	12—8	-24	-10	-16	13	-23	Indolence.		
82	13—3	-32	-69	-46	-7	-16	Absence	17	
83	12—7	..					Expelled.		
84	12—9	-33	-51	-29	-32	-24	Elim	Work	Work.
85	13—2	..					Elim	Married.	
86	14—2	..					Elim		
87	12—6	..					Absence	8	
88	12	-16	-72	-13	-30	-36			
89	14	-20	-35	-36	-38	-40			
		8th grade 13—5							
90	13—6	11	-10	-6	12	37	Indolence	Work	Work.
91	13—8	15	-29	-12	-31	-16	Indolence.		
92	15—1	-20	-43	-57	-24	-35		Too slow ...	Incap.
93	13—5	-27	-37	-31	-43	-32			
94	14—3	-31	-26	-37	-43	-32			
95	13—6	-40	-14	-57	-26	-32			
96	13—5	..	..	..	..	..	Absence	5	
97	16—1	2	-83	-21	-37	-35		Too lazy ...	Incap.
98	15	-34	-39	-35	-33	-40		Can't keep up	Incap.
99	13—5	-41	-28	-31	-38	-43			
100	14—9	-23	-56	-28	-20	-44		Too slow ...	Incap.
101	13—8	..	..	..	..	..	Absence Av.		
102	13—8	..	..	..	..	..	Absence	4	Moved away without warning
									Unknown

CONDENSED STATISTICS FROM THE FOREGOING TABLE.
(WITH ADDITIONAL FACTS)

Grade.	Enrolment.			Total.	Eliminated.	Per cent. eliminated.
	First Year.	Second Year.	Third Year.			
1	36	42	44	122	2	1.6
2	37	38	40	115	2	1.7
3	39	42	38	119	3	2.5
4	42	39	46	127	5	4.0
5	41	45	40	126	9	7.1
6	42	43	45	130	10	7.7
7	33	32	37	102	13	12.8
8	32	34	32	98	14	14.3
	302	315	322	939	58	6.2
Year.	Enrolled.	Failures.	Carried and eliminated.	Failed and eliminated	Total eliminated.	Eliminated for "Incap."
First	302	30	7	10	17	5
Second	315	35	7	12	19	6
Third	322	37	10	12	22	8
	939	102	24	34	58	19

of age unless released after fourteen on a "school and age certificate." (This stringent law went into effect during the third year of my Illinois research, and the anticipation of it went into effect at least a year earlier.) Ayres found that "irregular attendance is accompanied by low percentage of promotions." My own study fully corroborates this finding, and I also found that failure of promotion is almost certain to be followed by irregular attendance. My results also agree with Ayres⁹ third conclusion; namely, that "Low percentage of promotion is a potent factor in bringing about retardation;" but my study goes farther and reveals that under the lockstep (still the prevailing scheme of classification) something like one-half of all failures to carry grade may be attributed to inability to do the required work under ordinary conditions. The fourth conclusion reached by Ayres, namely, that "retardation results in elimination," is also found true in my study; and my figures reveal that more than half of all eliminations under the system studied were of students who failed to carry their work.

My table of statistics shows agreement with Thorndike's contention that¹⁰ "there is no support whatever in fact for the doctrine that the retarding force is greater in the early than in the later grades (grade one being left out of the question)." The striking fact here revealed is that the number of failures is so non-varying throughout the eight grades. Failure here meant retardation; and the per cent of failures throughout the eight grades in order is as follows: 12 per cent, 9 per cent, 10 per cent, 10 per cent, 12 per cent, 9 per cent, 14 per cent, 13 per cent. The highest percentages of retardation (the number of over age students who "carried" their work did not alter the relative per cents given) are thus found in the seventh, eighth, first and fifth grades. I believe that as compulsory attendance laws become more rigid, we shall find no reason to make Thorndike's exception of the first grade, and this too in spite of the fact that¹¹ "a very important cause of retardation in the primary grades is inadequate and irregular attendance," as Johnson found in his Pennsylvania studies.

My figures agree with Thorndike's¹² findings that the highest elimination occurs in the grammar grades; but the "greatest increase" in elimination here occurs in the seventh year, thus agreeing with Cornman,¹³ and not in the sixth or the last grammar grade, as Thorndike found. It is a significant fact that investigations

⁹U. S. Bur. of Ed. Bul. No. 4, 1907.

¹⁰THE PSYCHOLOGICAL CLINIC, Vol. III, p. 256.

¹¹THE PSYCHOLOGICAL CLINIC, Vol. III, pp. 89-95.

¹²U. S. Bur. of Ed. Bul. No. 4, 1907.

¹³THE PSYCHOLOGICAL CLINIC, Vol. I, p. 245.

agree in showing eliminations clustering chiefly around the seventh year (sixth, seventh and eighth). It is safe to say that the explanation is to be found in retardation plus the fourteenth year school law limit.

The causes of eliminations are not clear in Thorndike's study; in fact causes are difficult to find in studies of the extensive type. School records are far from reliable here, and we need many intensive studies upon which to base judgment. Thorndike is evidently correct in his belief that poverty, lack of interest in school work, and intellectual inability are important causes. My own study shows that alleged reasons, such as are found in school records, are as likely to be false as true (27 out of 58 alleged reasons agreed with the actual); that one out of three failing students left school, and that over one-half of all eliminations came from failures to carry school work (34 out of 58). I found also that even before the stringent new compulsory school attendance law went into effect in Illinois, eliminations as well as attempted eliminations came almost entirely from students near the fourteenth year age limit. (The old law in Illinois required but sixteen weeks attendance out of the year; and this was not hard to escape, if we judge from experience.) This agrees with Falkner's conclusion drawn from a review of Cornman's study, namely, that "dropping out of school depends more upon age than upon the degree of advancement in school studies."¹⁴

Criticism of Systems of Grading and Promotion.

In the light of the foregoing experimental study, we may now make a critical study of the various systems of grading and promotion which have gained some prominence in educational literature.

First comes the lockstep, at the very mention of which the school principal seems as ready to fly to arms as the savage does when his fetich is picked to pieces. But, however we may decry this time-honored system, and however shrewdly we may study to find a new name for our minor variations of this primal scheme of grading, the fact remains that the lockstep is the prevailing system throughout the states.

The Lockstep Characterized.

The lockstep system works the students of a given grade along together. If the grade is so large that it is deemed advisable to

divide it into any number of classes, the different sections still do about the same work in about the same time. The characteristic feature of the lockstep is that the students of a given grade move forward at about the same rate, hence the term "lockstep."

Criticism of the Lockstep.

Human beings differ enormously in mental capabilities. What, then, shall we say of the lockstep, which proceeds squarely on the assumption that students may do about the same quantity of work in about the same time? It harnesses together forty students, and with little respect for their individual differences, hobbles their legs of progress for eight years. Briefly told, the individual is hardly an individual under this system, but rather one-fortieth of a mass. Under the lockstep system—

I. The individual is lost in the mass.

The most serious aim in any system of grading should be, to group together students who need similar treatment, whatever that treatment may be. One asks, "How many children should be given to a teacher?" The answer in interrogative form is, "How nearly alike from the pedagogic standpoint are the members of the group or groups which she is to handle?" This is the first and foremost factor in settling the question of number.¹⁵ Forty students of like ability are more easily handled than twenty students of unlike ability; and the chances of carrying the work are easily in favor of a student in the better classified group.

Attention is here called to an interesting fact revealed by the statistics of the foregoing study. If but three-fourths as much work had been required of the forty-nine students who failed because of incapacity, forty-two (85.7 per cent) of them would have apparently been able to carry their work. I do not wish to imply here that they would have done so, but only that in so far as their records show, they could have been expected to carry their work. (This statement was fully justified by the number of these students who remained in this school after the grades were redivided into two groups each, on the basis of ability.) Coming directly to the point, a flexible system which, without giving more work to the teachers, would have divided each of the eight grades in this school into two groups, on the basis of ability, could have saved most of these failures, by working the less able students at a rate suited to their capacity. This fact indicates a second charge against the lockstep, namely,—

¹⁵See Cornman, "Size of Classes and School Progress," THE PSYCHOLOGICAL CLINIC, Vol. III, pp. 206-212.

II. It does not classify students so that the teaching may be readily modified to fit ability.

Again, the forty-nine students recorded as "incompetent," gave the teachers in this school more concern than all the other students (939 students in all enrolled in three years) combined. The dull students are the teacher's nightmare under this system, and she is bound to spend an over-proportionate amount of time trying to keep them from falling behind. Now, education should not consist mainly in coddling the weak, but rather in freeing the strong; and any system of classification which requires of the students more work than many of them can do under existing conditions, is sure to bind the teacher's time and attention upon the weak students. Hence arises a third charge against the lockstep system,—

III. It puts the emphasis upon the weak, rather than upon the strong.

There is another fact related to, yet quite distinct from, the second charge mentioned, which quite regularly appeared in the tests given in this study. It may be noted that there were ten students (about half of the class) who made in the arithmetic test previously recorded¹⁶ an average of about twenty-one problems. It is thus evident that the brighter half of this class might well have done more work in arithmetic than the amount required to fit the class average. As it has already been shown that the dull students are usually assigned too much work, so now we are confronted with the fact that the bright students are assigned too little work. This is a veritable companion of the lockstep system; hence a fourth charge against it:

IV. It does not work the bright students up to their mental capacity.

Returning now to the arithmetic test, the reader may wonder why promotion would not have been a reasonable suggestion for improving conditions in this class. The fact is, the boy who made the highest rank in this test was a strong all-round student. He was a good candidate for promotion, but the "jump of a year's work" was a bugbear to him and to his parents. Promotion over a large part of a year's work really does mean a serious struggle, with a splendid chance of losing a portion of the intervening work. Hence a fifth charge against the lockstep,—

V. It does not make promotion feasible.

Closely interwoven with the evidence up to this point is the

¹⁶See p. 66.

problem of adjusting the work to class instruction. The teacher who finds her class made up of students of widely varying abilities, is at one time tempted to adjust the work to the class average, at another time to the mode, again to the median, and still again to the duller half or to the brighter half, but never is she fully satisfied with any "adjustment" that she can make; for the reason that it is not an adjustment. Indeed, this study revealed the fact that in dealing with heterogeneous groups, the assignment of work may actually not fit a single individual; but instead, the class may be found to be divided into two groups, one on each side of the mark aimed at in making the assignment. The point to be noted here is that the lockstep class is nearly sure to present abilities represented by a broad surface of frequency, and this means poor opportunity to make well-adjusted assignments. Hence a sixth charge against the lockstep,—

VII. It does not facilitate well-adjusted assignments of work.

There is still another fact, distinct yet closely related to the preceding evidence, to which attention should be called; namely, the lockstep formally attempts to cast all students—the bright, the mediocre, and the dull—in the same mold. Now, the school is an institution whose positive duty it is to emphasize individual inequalities. ¹⁷"For the individual, concentration and the highest development of his own peculiar faculty, is the only prudence. For the state, it is variety, not uniformity, of intellectual product, that is needful. It is for the interest of society to make the most of every useful gift or faculty which any member may fortunately possess; and it is one of the main advantages of fluent and mobile democratic society that it is more likely than any other society to secure the fruition of individual capacities". ¹⁸"The ability to discover people's capacities, to find situations where they can be used to advantage, and then give the individual the opportunity to show his worth, is one of the secrets and necessities of all successful executive work." Measured by this yardstick, the lock-step system falls fearfully short; hence a seventh charge against it,—

VIII. It fails to emphasize individual inequalities.

Referring again to the statistics, the reader may note that 23.5 per cent of the failures to carry work were due to unavoidable absence. After a legitimate absence of a few weeks, the student, weakened by sickness perhaps, returns to school, only to find his

¹⁷Ex-President Eliot, of Harvard University

¹⁸S. C. Parker, Miami University.

grade beyond his reach. Now the loss of a grade is bad enough, but that may not be the worst of it, for under the lockstep the student who loses his grade formally loses a year, perhaps. Sickness steals a few weeks from his schooling, but the lockstep system steals the remainder of a year. Thus arises an eighth charge against the lockstep,—

VIII. It gives inadequate opportunity to regain loss due to absence.

We come now to the question of what responsibility the lock-step has in the matter of failures to carry school work, and this brings up the most serious charge, probably, that has yet arisen. The statistics of my study reveal the fact that in forty-nine out of one hundred, two failures to carry grade work were due to incapacity. These students simply could not do the amount of work that their fellows were doing under the given conditions. It has already been pointed out that had the grades of this school been divided each into two sections on the basis of ability, then a small reduction in the amount of work required of the weaker sections would have made it possible for 85.7 per cent of the otherwise incapable students to carry their work. (It would also have been advisable then to increase the amount of work of the more capable sections.) We may now go one step farther and say that, whenever it is found expedient to divide a class into sections, the division should be made on the basis of ability to do work; and that there should be just as many divisions as the teaching force can judiciously permit and the conditions require. This is exactly what the lockstep does not do. Instead, it aims to keep the students together, thus if it does anything at all like giving the stronger portion of the class enough work to do, or even aims at the class average, it fosters failures among the less competent students. Hence a ninth charge against the lockstep,—

IX. It fosters failures among the less capable students.

Next comes up the fearful question of elimination from school. The foregoing statistics show that out of fifty-eight cases of elimination, covering a period of three years in the given school, nineteen (33 per cent) left school because they could not do the quantity of work necessary to maintain class standing. A very large part of this elimination might have been obviated by the introduction of a flexible system of grading. A system, such as would have divided each grade into sections, on the basis of ability, and then worked each of the sections at the rate indicated by the new class average or mode or median, would have been

better for both sections, and at the same time it might have saved something like four-fifths of the forty-nine hopeless failures, and it would have saved fourteen (74 per cent) of the nineteen eliminations due to incapacity. Hence arises a tenth charge against the lockstep system,—

X. It is responsible for much elimination from school.

Special attention is now called to two students (numbers 7 and 44) in the list, who were victims of worry. They were two girls, with so generous a share of ambition and persistence that they could not leave their work partly done. The reader may note that each had one subject in which she was apparently "born short"; yet one (number 44) of these high-pitched little creatures was actually the leader of her class in all subjects except the fatal arithmetic. Though unquestionably incompetent to do the amount of work required of her class in this subject under existing conditions, it was discovered in her first private test that her habits of study in this branch were very bad. Everything on her desk had to be kept in just such a position or she became nervous. She spent much time in arranging things; and after she had worked a problem, fearing there might be an error, she went over the problem again and again. (This child's actual ability in arithmetic was, speaking approximately, something like sixty per cent of the class average; that is—40; but owing to nervous condition she was not held for further tests in arithmetic, hence definite grade in same cannot be given.) The other child was simply backward in her reading, and became nervous through worry over her difficulties. Both of these students were temporarily withdrawn from school as a result of nervous condition. Now, in justice to the despised lockstep, it should be said that no system of classification is immune to cases of this kind; yet the lockstep, above all others, is the system under which such students are not able to work. Hence arises an eleventh charge against the lock-step,—

XI. It easily works beyond a safe limit the slow but persistent student who is prone to worry.

There is still another consideration which should probably be weighed here. ¹⁸Serious arguments are now and then put forward for cutting down the elementary course of study to six years. Then, too, we have already thrown out portions of the subject matter which we are now pleased to call "obsolete." The fact is,

¹⁸Soldan, "Shortening the Period of Elem. Schooling," *Ed. Rev.*, Vol. 25, pp. 168-181; Greenwood, "Shortening the Time in the Elem. Schools," *Ed. Rev.*, Vol. 24, pp. 384-390.

there is a strong feeling that in some way we must not only stem the tide of the eight-year course, which has been stuffed and "enriched" till we are all threatened with school gout, but that we must actually cut down the eight years to six or seven. The several hundred tests covered by this study clearly indicated that some students ought to complete the course of study for the eight grades in less than eight years, while others should and some will take a longer time. It is economic, as regards both time and expense, that the stronger students be given opportunities to complete work as fast as their mental growth will permit, without going beyond the point of diminishing returns. We are sadly in need of facts to show where this point is likely to be, but it is at least safe to say that it is not the same for all students. Hence a twelfth charge against the lockstep,—

XII. It stands in the way of shortening the elementary school period for competent students.

Summary of Criticisms against the Lockstep.

By way of summary, and for convenience of reference, we have the following twelve indictments against the lockstep system:

- I. It loses the individual in the mass.
- II. It does not classify students so that treatment may be readily modified to fit abilities.
- III. It puts the emphasis upon the weak, rather than upon the strong.
- IV. It fails to work the strong students up to their reasonable limits.
- V. It does not make promotion feasible.
- VI. It does not facilitate well-adjusted assignments of work.
- VII. It fails to emphasize individual inequalities.
- VIII. It gives inadequate opportunity to regain loss due to absence.
- IX. It fosters failures among the less capable students.
- X. It is responsible for much elimination from school.
- XI. It easily works beyond a safe limit, the slow but persistent student who is given to worry.
- XII. It stands in the way of shortening the elementary school period for competent students.

Criticism of Systems Aiming to Avoid the Defects of the Lockstep.

Without exception, the numerous systems of grading and promotion have arisen through efforts to avoid the defects of the

lockstep system. There are so many of these systems that it will be found expedient to classify them for treatment under eight heads:

1. The double promotion system.
2. The double track system.
3. The group system.
4. The double tillage system.
5. The review back system.
6. The concentric work system.
7. The ungraded class, or individual, system.
8. The minimum work system.

The Double Promotion System.

The double promotion system represents probably the first wide movement to heal lockstep ailments. It grew out of the feeling that the old annual promotion scheme was an elevated road system with too few stations; and it set to work to double the number. No system perhaps has given us so many variations, and for simplicity and clearness we may deal here with that typical form which admits two classes a year in the lowest primary grade and carries them along through the grades about a half year apart. Unless some further movement toward flexibility is introduced, this system may be viewed as the lockstep with the unit of work reduced to the half year. It is clearly a marked improvement over the lockstep with the full year unit of work; the most commendable feature being that promotion, either positive or negative, is much facilitated by the shorter step. The fact that this typical form is clearly lockstep, however, with each of the twelve indictments holding against it, though most of them with diminished force, has led to many complications of this system by mingling with it some ingredients of the systems yet to be described.

The Double Track System.

The system popularly known as the double track system has been in successful operation in a few schools of a few states for a number of years. Cambridge, Mass., may be taken as an eastern type of this system, and Portland, Oregon, as a western type. The difference between these two types lies mainly in the fact that in Cambridge the plan is used only in the grammar grades, while in ²⁰Portland it holds throughout the grades. In other respects the two types may well be considered identical. The ²¹Cambridge plan

²⁰Portland City School Report. (Any recent year.)

²¹Cambridge, "Annual Report of the School Committee." (Any recent year.)

is outlined in the city's "Annual Report of the School Committee" as follows:

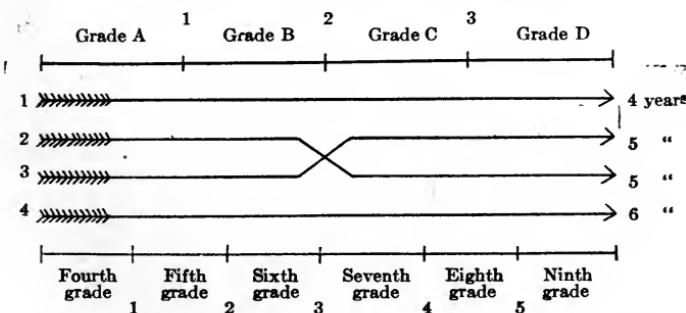
"The course of study is divided in two ways: (1) into six sections; (2) into four sections; each section covering a year's work. Pupils taking the course in six years are classified in six grades, called the fourth, fifth, sixth, seventh, eighth, and ninth grades. Those taking it in four years are classified in four grades, called grades A, B, C, and D. When pupils are promoted to the grammar schools they begin the first year's work together. After two or three months they are separated into two divisions.

"One division advances more rapidly than the other, and during the year completes one-fourth of the whole course of study. The other division completes one-sixth of the course.

"During the second year the pupils in grade B are in the same room with the sixth grade. At the beginning of the year they are five months (one-half the school year) behind those in the sixth grade. After two or three months, grade B is able to recite with the sixth grade, and at the end of the year both divisions have completed one-half the course of study—the one in two years, and the other in three years. The plan for the last half of the course is the same as that for the first half, the grades being known as the seventh, eighth and ninth in the one case, and as C and D in the other.

"There are also two ways of completing the course in five years: (1) any pupil who has completed one-half the course in two years may, at the end of that time, be transferred to the seventh grade, and finish the course in three years; (2) any pupil who has completed one-half the course in three years may, at the end of that time, be transferred to grade C, and finish the course in two years. In both cases the changes can be made without omitting or repeating any part of the course."

Diagram of the Double Track Scheme.



It is to be noted that the double track system aims to classify students on the basis of ability, and then to move the unequally competent classes forward at rates suited to the different abilities. Now, whether or not this aim is well carried out, it recognizes and attempts to proceed on the only sound basis for classification; namely, the ability to do work. The indictments laid against the lockstep grow pale before this system. The evils pointed out by six of these indictments are here reduced well-nigh to the minimum; but there is still much to be desired in the way of removing charges I, II, V, VI, VII, and VIII. There is one thing which this system does better than any other system known to educational literature,—it takes cognizance of the meeting points of classes moving through the course of study at different rates, and definitely plans to reclassify while on this common ground. Class disintegration is thus relieved at the zero point of the scale of promotion. Promotion at other times under this system is about as feasible, on the whole, as it is under the double promotion scheme.

The argument that ²²“dull students should have a few bright minds mingled in the classes with them in order to afford stimulation and example,” can hardly be regarded as sound. The counter-claim that bright students under the double track scheme continually find their way into the slower classes through promotion, is equally worthless. Both of these arguments fail to recognize the most valid principle in classification; namely, the principle of homogeneity of groups. There is one vital caution that must go with the double track system, and that caution is: See that no stigma is attached to the “freight train” classes, and that the clamor for the privilege of “taking the express” is silenced by a judicious hand.

The Group System.

In the group system we again meet many variations, though all may be conveniently subsumed under the three types that follow.

The St. Louis Plan.

The St. Louis plan was introduced into the schools of St. Louis, Mo., by Dr. William T. Harris (late commissioner of education), as long ago as 1872. This plan divides a large school into something like thirty-two classes, representing steps of about one-fourth a year's work each, from the first grade to and including

²²“The Cambridge Experiment,” N. E. A. 1894, pp. 338, 342.

the eighth. Work is laid out on the basis of the average class as determined by experience. Some classes do more than this amount, others less; but there is no artificial time limit. The work of a quarter begins at any time of the year. Promotion to the high school occurs twice a year.

Feasibility of promotion, with all that this implies, is the strong feature of this plan. It is twice as efficient in this respect as the double promotion system. Dr. Harris was clearly a pioneer in this field, and long ago he expressed his opinion of the group system as follows:

²³"Thirty classes between the first and eighth years are possible in the large schools in cities. That all cities do not avail themselves of this possibility is one of the most serious defects in American supervision."

The Elizabeth Plan.

The ²⁴Elizabeth plan was introduced and successfully operated for a number of years in the schools of Elizabeth, N. J., by Superintendent William J. Shearer. It is little more than an elaboration of the St. Louis plan. It made from thirty to sixty grade divisions below the high school. Each division advanced just as far during the year as the ability of the students enabled them to do the work well. There was no set amount of work, and no time fixed for the completion of the course of study. Pupils worked in small classes in the "essential" branches only.

This scheme evidently intensifies all the commendable features of the St. Louis plan, and puts a little more definite emphasis upon the adjustment of the quantity of work to the ability of the students, independent of time limits for completion of the course of study. The objection may be raised that the scheme is quite complicated, and that it means so much machinery that (1) it is not feasible to hand it over to a successor without loss, and (2) there is likely to be a tendency to worship the machine. In spite of these objections, however, which are by no means confined to this system, we must not fail to see in this plan an admirable move toward reaching the ideal of efficiency in the individual by attempting to provide for the students largely as individuals, without losing the social principle.

The St. Louis and the Elizabeth plans both lay great stress on the matter of promotions. It is through promotions that they aim to give the individual special opportunities to advance as fast

²³"System of Grading Pupils in St. Louis," *Ed. Rev.*, Vol. 8, pp. 387-389.
²⁴"The Elizabeth Plan of Grading," *N. E. A.*, 1898, pp. 441-448.

as ability permits. This they do by making a short step from class to class. Briefly told, their aim is to maintain plastic groups. This aim is good; yet when we realize that promotion has in itself no educational value whatever, and that under these plans promotion can hardly be accomplished without loss in the "jump", we must concede that both these schemes fall short of an ideal system of grading. Just what this lack is, may best be indicated later, in the treatment of the homogeneous group.

The Double Tillage System.

The double tillage system is a New England product. It was in operation in the grammar grades of ²⁵Woburn, Mass., for a number of years (1894-1904), and since this city has given us a typical form of the system, it will serve our purpose here. (The plan has been named the "double promotion" system, but this name is not used here for the reason that it is now misleading.)

By way of introduction, it may be stated that the primary department in Woburn followed the plastic group scheme, thus enabling many students to complete the three years' work in less than the usual time. Beginning with the fourth grade, the "essential" features of each year's work were covered during the first semester of each year. Students who "successfully" accomplish this work, especially in language and in arithmetic, were advanced to the next higher grade at the semi-annual promotion. Bright students could thus pass through two grades in one year. During the second semester, the students who were not advanced (this meant the main body of the class), now joined by the influx from the next lower grade, again covered the ground (hence the term "double tillage") which they had hastily gone over during the first half of the year, but "in greater detail."

There is little to commend and much to condemn in this system. Clearly, its aim is to dismiss charges mentioned in indictments III, IV, V, and XII, against the lockstep. This it does, but only by going to a fearful extreme that puts the sin on the other side. It may be noted that, carried to its logical conclusion, this system would present the child to the high school at ten years of age. It may be advanced as all but proven that this pace must carry the child beyond the point of diminishing returns. The aspect of superficiality of the work makes one tremble; the teaching can surely not be other than mechanical, and the rush under the burden of the gouty modern curriculum is anything but com-

²⁵"Grading and Promotion of Pupils," *Ed. Rev.*, Vol. 18, pp. 231-245.

mendable. Then, too, the second time over the ground, in spite of any theory to the contrary, is bound to mean pure repetition in the main, rather than work in "greater detail"; for it is to be noted that this work is new to the considerable number of "bright students" recently promoted to the classes. The system is interesting in that it shows what a desperate attempt has been seriously made to cure lockstep evils. We can admire the motive, if not the means and the end.

The Review Back System.

Rather closely related to the double tillage scheme, is the review back system which seems to have found its most comfortable home in Iowa. LeMars, in this state, gives us a good type, as follows:

The class intervals are short, ranging from six to eight weeks in the primary grades, and from eight to twelve weeks in the grammar grades. At ²⁶"suitable and varying intervals", each class is reviewed back to meet the next lower class. At this point, all students deemed competent, as indicated by the recommendation of the teachers and not by examination, are excused from review and promoted to the class reviewing to meet them. The rate of progress between reviews is determined by the abilities of the stronger members of the class, since the others are soon to review.

The aim of this system is strikingly similar to that of the double tillage scheme, though it may be far better worked out. We may concede that it removes the evils mentioned in indictments III, IV, V, VIII, and XII, against the lockstep. The fact that the plan provides for reviews at ²⁶"suitable and varying intervals", gives us a rather meager basis for the criticism of the system in general. What the suitable interval is, and how often it comes, are vital matters to be dealt with as specific instances arise. The fact that the intergrade intervals are short, may mean improvement over the double tillage scheme, though this is by no means assured. (I will state here that I have not found an instance in which the reviews are so frequent as to virtually reproduce the weaknesses of the double tillage system.) We are hardly ready to condemn the system, however, until we note that "the rate of progress between reviews is determined by the abilities of the stronger members of the class"; but here we see the double tillage evils with the time limit removed. Experience shows that the less the individual abilities vary in the different classes under this system,

*Prince, "Gradation and Promotion of Pupils," *Ed. Rev.*, Vol. 15, p. 241.

the less the attendant evils. In other words, we have the paradox,—the less the review back scheme is called into use, the better.

The Concentric Work System.

The ²⁷concentric work system has been well worked out in the schools of Santa Barbara, California. The plan follows the group system in dividing each grade into three groups, A, B, and C. These groups work concentrically, A doing the work more intensively than B, and B more intensively than C. In arithmetic, by way of illustration, the C section works on the more simple relations, perhaps holding rather closely to objective work; B increases the complexity and abstractness, and A works in a still more advanced way. Promotion is from section to section, the C becoming B, the B becoming A, and A in turn becoming C in the next higher grade. Promotion normally occurs three times a year. The system also permits individual promotions, under the usual group system facilities. Promotion is based on the teacher's judgment. Individual promotion from section to section within the room, does not necessitate the usual "skipping" of work, but it merely places the student in a class where he may attack the work in a more comprehensive way, since he already knows the "compass points and the main highways" of the work.

This system has one strong feature to distinguish it from the St. Louis plan, but in other respects it may well be considered identical with that plan, with the number of groups in each room reduced from four to three. The distinguishing feature referred to is to be seen in the fact that the concentric scheme of work is closely related to the spiral method of attacking subjects, and promotion within a grade, therefore, is not a jump into strange subject matter, but rather a shift to a point where a deeper view of familiar subject matter is possible. Since this is made possible without additional machinery, indeed must reduce the machinery or else cause the spiral to turn too often, this feature is clearly commendable.

The Ungraded Class, or Individual, System.

In the so-called ungraded class, or individual, system, we again meet variety. We have the old familiar ungraded school, with its multifold classes; the modern ungraded class or ungraded room, which may be considered a refuge for the misfits under any system, and Mr. Search, in his "Ideal School", has attempted to

²⁷Ed. Rev., Vol. 19, p. 297.

give us an individual system based on the laboratory plan. The Search scheme was given a short trial in ²⁸Pueblo, Colorado. In this scheme, the school room takes on the laboratory, rather than the class room, aspect. The social principle is not lost, but the class recitation reaches almost to the vanishing point. "Always busy with advance work", is the watchword Mr. Search sets up.

Batavia, New York, gives us the best type of the individual system for critical purposes, for the reason that its plan has been worked out in quite definite detail.

The Batavia System.

The ²⁹Batavia plan aims to give definite place to individual instruction. This is the keynote. In each of the larger class rooms, this plan puts an additional teacher, whose function it is to take any student the moment he begins to lose ground, and bring him up through individual assistance. It is assumed that this requires the development of a technique different from that needed in class instruction, for two reasons:

1. The students are not allowed to ask for aid, but the teacher must discover their weaknesses and take the initiative.
2. All individual instruction must be given by the development method, thus avoiding too much help.

While the "extra teacher" is the ideal plan in this scheme, this is not demanded in the smaller rooms; indeed, more than one-half of the Batavia class rooms have but a single teacher. It is noteworthy that the distinctive demand is that definite place be given to individual instruction. This is made possible in the one-teacher rooms by what is called a "doubly alternating" program. In this program, each alternate recitation period is given over to the individual instruction of the weaker members of the class. The individual period and the class period thus alternate in each subject of the program. (First alternation.) Similarly, the individual period in one subject alternates with the class period in the next subject of the program. (Second alternation.) Under normal conditions, therefore, two individual periods never come together. During the individual period, the students assisted are called to the teacher's desk one at a time, while others work independently at their desks. Tests, prepared by the superintendent, are given at the close of each term, and all promotions are made on the basis of these tests.

This system strives to escape the charges against the lockstep

²⁸Search, "Individual Teaching : The Pueblo Plan," *Ed. Rev.*, Vol. 7, pp. 156-170
²⁹Bagley, "Class-room Management," pp. 214-224.

mentioned under indictments I and IX. It may be conceded that it quite escapes the ninth charge, since it devotes one-half the teaching effort toward avoiding the usual failures. It escapes the first indictment in so far as the students receive individual attention. It also meets successfully the tenth indictment.

On the other hand, the third and the seventh indictments hold against this system with double force, and the fourth is lifted into bold relief. Double exertions are here put forth in the attempt to cast students—weak, mediocre, and strong—in the same mold. No one could criticise this plan for its attempt to help the poor weak student; but it would be interesting to hear the argument for placing this increased stress upon the weak, rather than upon the strong; and doubly interesting to hear the alleged reasons for reducing to one-half, in the one-teacher rooms, the time of the teacher to which the bright students are entitled. This is clearly in violation of the principle of economy, for the time and expense devoted to the more gifted students would yield far greater returns. We are altogether too easily deceived by the time-worn argument that the gifted student, "the genius" perhaps, will "get along somehow without much teaching." The fact is, the gifted Maud S. and the brilliant Dan Patch are the ones who need the closest attention of the skilful mechanic. It is this plug that economy first abandons. Then, when it comes to reducing the number of recitation periods in the smaller rooms to one-half, by the "doubly-alternating" program scheme, and giving to the weaker students the time and attention thus wrested from the brightest members we wonder if the next step will be to rule the bright minds out of school privileges entirely in so far as the guidance of the teacher is concerned. Here is a system which has evidently gone to extremes in the matter of favoring the dull student. It clearly violates the principle of economy.

It may be noted that the one-teacher room reveals another weakness in this scheme. During the individual periods, the teacher is engaged with one student while all the others in the room are supposed to be "working independently at their seats". It is commonly conceded that the study period is one of the most serious problems confronting us. The teacher who has tried the plan of spending a half hour instructing students singly at her desk, with forty others to be kept "engaged at their seats," will readily conceive the difficulty of supplying independent work, under such conditions, for forty students of widely varying abilities, to say nothing of the problem of discipline.

Finally, the Batavia plan expressly states that all tests are prepared by the superintendent, that they are given at the close of each term, and that all promotions are made on the basis of these tests. The stated reasons for these tests are (1) to check the tendency toward "coaching", and (2) to avoid the pernicious influence of "soft pedagogy". Now, were these tests aimed alone at the teacher's work, they would still be unjustifiable as a means of protecting the students against poor teaching. It would be putting the "burden" upon the innocent. The tests are conceded to be used, however, as a basis for promotion. Now I believe we have reached the time when we are ready to admit that the teacher who comes into intimate daily contact with pupils, is far more favorably situated than the superintendent, to pass sound judgment on the matter of promotion. We have followed a bad tradition too long already. A few examination questions can best give but a poor insight. It is to be hoped that our educative processes produce real living effects, emotional, volitional, and intellectual, that cannot be measured in any such simple and formal way. Furthermore, the test at the end of the term gives us not only the familiar pernicious cramming, but it puts too great strain upon the child when he is least able to bear it.

The Minimum Work System.

The minimum work system has been worked out on a broad basis in Denver, Colorado. The Denver plan³⁰ maintains the half year interval in the grammar and the high school grades, but shorter intervals below the grammar grades. Promotion periods are not fixed in the primary grades, but in the grammar grades the semi-annual scheme is followed. By the time the grammar grades are reached, all students are held for definite minimum requirements. Each room is provided with supplementary sets of books and a carefully selected reference library of from fifty to seventy-five volumes. While those students who can hardly accomplish more than the minimum requirement in a given subject are mastering a given assignment in that subject, other students who are capable of doing more work, yet not quite suitable for promotion, are, "by a process of natural selection, detaching themselves temporarily from the class" in order to work on studies in which they are weak, or "for broader or deeper study of topics by means of reference books, or for gathering illustrative material, or for following some line of interest approved by the teacher." Those

³⁰Proc. of N. E. A., 1898, pp. 434-441.

who are thus excused are liable at any time to be required to re-join the class "in order to assist others." The privilege is cancelled promptly when a satisfactory degree of proficiency is not reached. A few experiences of this kind make the students cautious, and the earlier they occur, the better. "The central thought in the system is individual responsibility".

It may be fairly said that this system, more than any other, must look to the teacher for its value. The experienced teacher readily sees what this "personal responsibility" means. We have all seen teachers who could make a beautiful showing with this system; we have seen many more who would make a beautiful failure out of it. The system is commendable on the whole, for it reveals an admirable attempt to rescue the individual from the mass; yet withal, it is dangerous, more constantly so than the one-teacher Batavia scheme, since every student will be excused in at least one study, some of the time. A student who could not be, would be unhappy indeed.

Beyond the fact that this system may give a good account of its efforts to remove the charges mentioned in indictments I and VII, it is claimed that under this plan the students are definitely trained in the use of reference materials; that there is no hurrying through the grades; that it evens up the various studies, and that it enables the teachers to devote time to the less able students without robbing others.

The claim that the system definitely plans to train the students in the use of reference materials, is to be conceded unequally true, and decreasing in proportion to the scholarship. The "no hurrying through the grades" claim is to be granted, but this not only may become a negative weakness, but it certainly tightens the grip of indictment XII. The claim that it "evens up the various studies" is clearly true, and this lifts into beautiful prominence the law of multiple subjects which is given later in the treatment of the homogeneous group system. The claim that it enables the teacher to devote more time to the less able students without robbing others, is a doubtful half-truth. The principle of economy is more than likely to creep in here as in the Batavia scheme.

For the sake of emphasis, it may be repeated in part that the strong feature of this system is the definite aim to reach the individual, and the best means of working out this aim is to be seen in the privilege offered the student to follow out "some line of interest approved by the teacher". Under skilful management this may become an invaluable means of cultivating the spirit of "self-

direction, self-initiative, self-realization, self-perfection, and self-assertion", which Münsterberg finds at the basis of American success.

The Homogeneous Group System.

There are two principles which must underlie the ideal system of grading and promotion, whatever that system may be:

1. The individuals of the grade are to be socialized.
2. The instruction of the grade is to be individualized.

How now are these apparently contradictory requirements to be realized? Were it possible to bring together a group of children exactly alike from the educational standpoint, it would seem that our problem had found a solution; for we could then realize our social principle and yet have the instruction individualized, since method and material adapted to one would be likewise adapted to all. Such a group, however, is not at hand. It could afford a very poor training if it were. Nowhere in society do we find people exactly alike, and if we could find such similarity it would be a poor, monotonous society, lacking the wholesome stimulus which comes from diversity. It is the diversified society in which the individual should be trained; and fortunately, nature has given us nothing else for our schools. The best training is possible only in a society made up of persons sufficiently alike to enable them to understand and to sympathize one with another and to work together for their common good, yet sufficiently unlike to reveal the advantages and the needs of so working together. Our problem of grading and promotion, then, is that of selecting from a highly diversified society, groups of children sufficiently alike to be similarly treated. We want them just as much alike as we can get them, since natural conditions are such that there is not even remote danger of overdoing this selective process. Stated in other words, the school grades are to be homogeneous groups.

Since human beings are so specialized in abilities, it becomes a far more different process to select a group of children sufficiently alike in abilities in all the usual school subjects. This means that in the best system of grading, the group in one subject is not at all likely to be individually identical with the group in another subject; hence the large school, with the larger field of selection, will continue to have its advantages in grading over the smaller school.

Apropos of the point brought out in the last paragraph, there is a working principle, not uncommon in experience, which is

worth formulation and definite statement. It may be expressed as follows:

The Law of Multiple Subjects.

An increase in the number of subjects in the school curriculum, tends to move the average standing of an individual toward the class average.

Stated in other words, student abilities commonly vary more in one subject than in the average of all subjects. This means some relief for the system using the one class for all subjects; since with many subjects under this system, the student's average ability is likely to deviate less from the class average than if there were but one subject.

Furthermore, this variation has an intrinsic basis, with reference both to the individual and to the subjects; therefore, whether the problem of multiple studies is viewed as a matter of correlation or of differentiation, the law of multiple subjects remains valid.

Again, it is to be noted that we may have a group of students equally prepared to attack any given subject matter, say long division. Such a group we may say is statically homogeneous. Some of them, however, may be competent to master the processes far more rapidly than others; that is, the group may not be dynamically homogeneous. Now it is dynamic homogeneity for which we are to look, rather than static; though it is the latter which we have so long sought. With something like static equality to begin with, the dynamically equal group will in itself take care of the question of static homogeneity, while such a group makes it possible to work each student up to the measure of his ability; and the problem of individual promotion disappears in the degree in which this condition is reached. All this serves to show (1) that the matter of grading is far less simple and formal than is indicated by most of our systems; (2) that personal acquaintance, with adequate insight into our students, is a matter of far more vital consequence in the problem of grading and promotion than any machine can be, and (3) that the familiar "ten examination questions" sink to wretched assumption in view of such a standard.

One of the most serious obstacles in the way of effective grading and promotion is found in the ever ready belief that there is "a system" which will fit all conditions. The fact is, there must be about as many variations in a system as there are schools to use that system. We need to free ourselves from the notion that there is a ready-made form of anything that can fit two different things. It is a matter of common observation that no two schools

move under identical conditions. We must follow the example of the tailor in first taking a general view, then making definite measurements, but not forgetting that the skill is shown in the fact that a little is allowed for here, and a trifle is taken up there, in order to make the final fit; that is, in order to make the best adjustment.

The school with an enrolment of eight hundred students in the eight grades, and the usual teaching force, may effectively classify its students into homogeneous groups in each subject; while the school with three hundred students may find its best adjustment in groups as nearly homogeneous as possible with reference to all the major subjects. Any system of grading is bound to grow less effective as the enrolment becomes small; and in the small school the only permanent rule is to realize the homonegeous group aim as far as possible with the means at hand.

Perhaps Germany has outdone us in the matter of realizing a system of grading on the basis of dynamic homogeneity. Dr. Sickinger devised and introduced (1899) at Mannheim³¹ a system that has since become known as the Mannheim system. It is now used in Berlin, Leipsic, and other important cities of Germany. The system is essentially as follows:

The Mannheim System.

Proceeding squarely on the principle that the school must deal with the child according to his ability and development, four (or five) parallel courses are offered; namely,—

A, an eight year course for normal pupils to cover in eight years.

B, a five or six year course for retarded or dull pupils to cover in eight years.

C, a four year course for sickly and abnormal students to cover in eight years.

D, an eight year course for very bright students to cover in three or four years.

To these four courses is added a fifth, E, which is the preparatory school course (for students planning to enter the Gymnasium, Real Gymnasium, or Realschule, and who have completed course D).

Such is the external aspect of the system. When we come to the inner aspect, we find that in order to carry out the plan of the organization, the number of students per teacher is limited as follows:

³¹Moses, "Die Neuorganisation der Volksschule in Mannheim," Zeitschr. für Schulgesundheitspflege, XII, 1899.

Under Course A, 40 students.

Under Course B, 15 students.

Under Course C, no limit.

Under Course D, 40 students (smaller number usually found).

The treatment is modified to suit the needs of the groups, especial care being taken not to overtax students of groups B and C. The most experienced teachers are appointed to group C.

It may be noted that the Mannheim system resembles the double track system, though it offers four distinct tracks (D and E combine in one), with less shifting back and forth. It undoubtedly represents the most advanced scheme yet operated on the basis of dynamic homogeneity. It has its defects, to be sure. Classification is by grade, not by subject; hence the child has to spend most time on the subject in which he is least competent, and he gives the least time to the subject in which he is most gifted. He must serve his time in each subject. Indeed he may spend more time, but there is no way to shorten the time of a given subject for a given individual in a given group. The gap between groups A and D is far too great; and so here and there we see lockstep symptoms creeping in. The most that may be said for it is that it is an advanced step in the right direction.

Summary.

By way of summary it may be said (1) that we have reached a point in school administration where the lockstep system of grading and promotion is no longer tenable; (2) that the numerous systems which have arisen in the hope of curing lockstep evils have accomplished much; yet with full recognition that there are good factors in all of these systems, it is still very evident that not only do most of them tend toward machine-like administration, but that none of them gives us an adequate basis for conserving both the socialistic and individualistic principles which the present educational movement demands; (3) that these demands cannot be met in any simple, ready-made way; but (4) that they should be met by the classification of students into groups just as nearly homogeneous, both statically and dynamically, as the teaching force of any school can judiciously permit; and (5) that promotion and demotion should be based neither wholly nor mainly on the set examination, but rather on the deliberative judgment of those who come into daily living touch with the students.

PART II. THE DYNAMIC ASPECT OF THE PROBLEM.

In the preceding part of this paper it was stated that personal acquaintance with the capacity of the student is the vital thing in any handling of the problem of grading and promotion. It may also be said that this is the vital thing in any teaching. Given a bit of subject matter, an impersonal experience, which is to be communicated from one individual to another, we must have two conditions fulfilled before the aim can be realized, (1) the one who is to receive the impersonal experience must have a stock of personal experiences adequate to give meaning to the subject matter; and (2) the impersonal experience must be presented in such a way as to call forth and utilize these personal experiences. Personal acquaintance with the student must therefore reach out in two directions, (1) the teacher must know what personal experiences the child has which she can utilize; and (2) she must know how to present any given bit of subject matter so as to call forth and utilize these personal experiences. It is the second of these two essentials with which we are now to deal.

After the teacher has assured herself as to what personal experiences of the child she can use in teaching any given bit of subject matter, her next serious problem is that of determining how to present the subject matter so as to get the best response from the child. Moreover, since we are engaged in class teaching, the teacher's problem is actually enlarged to the still more serious task of presenting the given subject matter so as to extract the best responses from the minds of a group of students. If one child is chiefly auditory in his stock of experiences related to the given subject matter, then a presentation suited to an auditory response is more likely to succeed with him. So, too, a visual presentation favors a visual response; a motor presentation, a motor response; and so on. A knowledge of the ideational types of school children is therefore a matter of deep concern in teaching; and a study of the relation of ideational types and the method of presenting subject matter may throw some light on the problem of grading and promotion.

The Problem of Discovering the Ideational Types of School Children.

Many psychologists and many students¹ of education have recently been busy with the problem of ideational types. We have made some progress in this field, especially in the study of adult minds; but we may as well frankly admit that so far we have found no reliable means of determining whether a child is really

visual, or auditory, or motor-minded. The difficulties in the way when we attempt to study the child mind are chiefly as follows:

1. Introspection is needed to save us from all sorts of errors, and the child is not gifted in this field. Indeed, we have found that even the adult student of psychology needs considerable training in introspection before he can give us reliable data.

2. It is essentially true that all minds are mixed types; that is, visual in reference to one experience, auditory in reference to another, kinaesthetic, cutaneous, olfactory, gustatory, and organic, in reference to others. Then there are the compounded reactions: auditory-motor, visual-motor, and so on; and the differentiated forms, visual-verbal, visual-concrete, speech-motor, eye-motor, hand-motor, and so on.

3. Any given mind is likely to change in its type of response to a given stimulus as experience widens. As the child develops, the visual-concrete is probably ever ready to become visual-verbal, hand-motor imagery comes in, and so on. The adolescent mind is probably a shifting and variable quantity in its ideational responses.

In the face of all these manifold responses, our objective tests have failed, and we are beginning to realize that objective tests without introspective details can hardly reveal mental types. It is the old lesson on objective evidence learned over again. Then, since reliable introspection requires a degree both of attention and of analysis that is not found in the child, we can see the justification for the statement that so far at least, our means of penetrating the child mind are very questionable cues to ideational types.

What is the Evidence of Ideational Types?

There is another difficulty that meets us here, namely, we are not agreed as to what evidence we shall say reveals the ideational type. Shall we say that the mind's reaction to an immediately present stimulus is the evidence? Or, rejecting this primary response, shall we accept as evidence the response which the mind makes when it is freed from the immediate spell of the stimulus? In other words, shall we classify according to the primary or the secondary response? The two by no means necessarily agree, as may be seen by the following tests with trained introspectionists:

The German word "Anziehung" was pronounced aloud by the experimenter, then the subjects (trained introspectionists) counted aloud to twenty (distraction method), and then wrote the word as they understood it.

¹Perhaps the most active student in this field at present is Colvin. See bibliography.

Introspection of first subject.—“(1) My primary response was wholly auditory. I heard the word ‘Anziehung’, and the voice of the speaker rang in my ears. (2) My secondary response was wholly visual. The moment I started to write the word the visual image of it flashed into my mind; and I could see the word almost as distinctly before I wrote it as after.” (This subject had acquired German from books, and could not speak it freely.)

Introspection of second subject.—“(1) I heard the sound of a strange word, and found my vocal organs trying to reproduce it. No visual image whatever. (2) After counting and starting to write, I saw the word in my mind and I visualized it before and during the writing. Purely visual.” (This subject was known to be visual in German.)

Introspection of third subject.—“(1) I heard a combination of syllables, but the word had no meaning to me. I saw nothing; but the sound lingered, and a faint inner speech was at work. (2) The first syllable was reproduced from the sound which still lingered after repeating the numbers. So much purely auditory. The remaining two syllables came through audition and vocomotor imagery.”

Referring now to the first subject, shall we classify him according to his primary response? If so, he is auditory in this instance. Shall we classify him on the basis of his secondary response? If so, he is visual. As to the second subject, he is auditory-motor if classified according to the first response, and “purely visual” according to the second. The third subject may be classified on the basis of either primary or secondary response without change.

It is a significant fact that these subjects all accepted the classification as shown by the secondary response, but that the first two refused to be classified on the basis of the primary response. It is not to the present purpose to try to settle this matter here; but there is strong evidence that, with further study, we shall come to accept the secondary response as the only reliable evidence of mental types. When the individual is enslaved by the immediate presence of the stimulus, he is hardly free to reveal himself. Now, if we do accept the secondary response, and not the primary, as the real cue to ideational type, it is evident that we are confronted with a new difficulty when we attempt to discover the types of children. At present, the only certain statement is that the problem of discovering the ideational types of children is a hard and complicated problem, with no reliable solution at hand.

Believing, as it seems we must, that the child mind is all the

time responding in manifold ways, we can at least allow for each and for all types in presenting subject matter, and see if any effects are evident. This is, in part, what Lay, Itschner, Fuchs and Haggemüller,² and others have done in their studies of the spelling problem.

Study No. 2.

Proceeding on the assumption that a series of experiments, in which the different kinds of presentation, visual, auditory, etc., are controlled, might throw some light of student capacity, and hence upon the problem of grading and promotion, I have made two series of experiments, using (1) a senior class of normal school students (females), already familiar with experimental methods; and (2) an eighth grade whose members (males) were believed to vary widely in mental abilities. The object of these experiments may be stated in the form of two questions:

- (1) What is the relation of the kind of presentation of subject matter to student capacity?
- (2) What light does the study throw on the problem of grading and promotion?

I. Normal School Tests.

Using three-letter nonsense syllables, four series of tests were made on a class of sixty-four normal school seniors, all females, ranging from eighteen to twenty-four years of age. Each series comprised three tests of ten nonsense syllables each. A new list of syllables was used in each test. The syllables were known at sight by the students, since the list of one hundred syllables from which they were selected was made familiar in order to avoid complication of records through mis-spelling. A suggestive portion of the list is given below.

mil	tor	bab	sen	lab
hib	nen	ron	han	teb
nop	tiv	lat	eal	bal
gan	lun	nid	sep	cam
col	ris	zel	nus	ral
mon	wes	mip	ret	pel
pol	nep	bik	nol	rof
num	har	nup	tam	hon
lus	fac	gog	nad	com
bim	rav	ter	mul	rem

The nonsense syllables were made familiar by exposing the

²All these are summarized in *Psy. Rev. Monograph*, No. 44, 1909, pp. 131, 132.

whole list, alphabetically arranged on the blackboard, for several days. The students knew the purpose, and they were allowed to read or scribble them daily. It has already been stated that the object of this procedure was to eliminate the spelling test. It is a fact that the nonsense syllable test as usually employed is largely a spelling test. The order and position of the syllables in the tests were not counted, for the reason that a test in learning and immediate memory was sought, rather than a test of "rote memory."³ (Meumann's⁴ system of marking nonsense syllables does not alter the results of these tests.)

The first three-test series was made with visual presentation. A simultaneous exposure of ten seconds was made from a blackboard with each separate list. At the expiration of ten seconds the curtain was drawn over the lists, and immediately each student wrote the syllables she remembered. The second series proceeded similarly with auditory presentation, each list being read by the experimenter in ten seconds. The third series was presented (simultaneously) on the blackboard, and the syllables were rapidly written by the students, thus combining a visual and a motor presentation; time limit, twenty seconds. The fourth series combined an auditory and a motor presentation, each syllable being pronounced by the experimenter and rapidly written by the students; time limit again twenty seconds. Finally, a series of three tests of sixteen syllables each was given by a four-fold presentation, as follows: (1) Seeing, sixteen seconds; (2) Hearing, twenty-four seconds in reading; (3) Reading aloud, twenty-four seconds; (4) Writing, thirty-two seconds. One presentation here was immediately followed by the next, with no loss of time between.

The final writing of the tests was never hurried, but only a reasonable time was allowed. A short breathing spell was given after each test, and a three-minute recess followed each series of three tests.

A summary of the scores is given below, indicating the total number of syllables written by all the students in each test. The order and position of syllables were not counted.

SUMMARY OF SCORES REDUCED TO PER CENT AVERAGES.

	Visual.	Auditory.	Visual and Motor.	Auditory and Motor.	Combined Visual-Auditory-Motor.
Group 1	549 = 70 %	461 = 60 %	603 = 77 %	518 = 66 %	863 = 69.15 %
Group 2	353 = 56	442 = 70	403 = 64	480 = 76	693 = 68.75
Group 3	279 = 55	296 = 58	378 = 74	397 = 78	551 = 67.5

³Whipple's Manual of Mental and Physical Tests, page 356.⁴Die Experimentelle Pädagogik, I, 1905, p. 67.

TIME ALLOWED.

1. Visual presentation	10 syllables,	10 seconds.
2. Auditory presentation	10 "	10 "
3. Visual and Motor presentation	10 "	20 "
4. Auditory and Motor presentation	10 "	20 "
5. Combined presentation	16 "	96 "
a. Visual		16 "
b. Auditory		24 "
c. Concert reading		24 "
d. Rapid writing		32 "

In compiling the results the students were grouped so as to make handling convenient. It may be remarked that the first group of students (26) gave best results, roughly speaking, wherever visual presentation came in; that the second group (21 students) reached best results wherever auditory presentation was made, while the third group (17 students) showed best results wherever motor presentation came in. In the last series of the tests, no attempt is made to distinguish the hand motor from the speech motor types. Furthermore, no effort was made during the tests to inhibit silent movements of tongue, lips, and so on, for the reason that (1) it would have been impossible to keep them out entirely, and (2) no distractions were welcome here.

Many facts of interest are revealed by this experiment, but for our present purpose the one significant fact is that these three groups of students (we may roughly call them optiles, audiles, and motiles) vary widely in abilities wherever a single form of presentation is given, less widely when a two-fold form is used, and when the presentation covers all three forms (visual, auditory, and motor), the variations, both as to individuals and to groups, are reduced to narrow limits. This may be made clear by the following:

TABLE OF VARIATIONS.

Form of Presentation.	Low Score.	High Score.	Total Average.	Mean Variation.	Per cent Variation.
Visual	13	24	18.45	2.43	13.12
Auditory	12	24	18.73	1.82	9.72
Visual and motor	16	27	21.63	1.75	8.09
Auditory and motor	15	26	21.80	1.73	7.94
Visual, auditory and motor	25	39	32.92	2.60	7.90

The three groups show the following variations under the different forms of presentation (see table on preceding page):

GROUP VARIATIONS.

	Average Score (Per cent).		
	Group 1.	Group 2.	Group 3.
Visual presentation.....	70	56	55
Auditory presentation.....	60	70	58
Average for single form.....	65	63	56.5
Visual and motor presentation.....	77	64	74
Auditory and motor presentation.....	66	75	78
Average for twofold form.....	71.5	70	76
Threefold form of presentation.....	69.15	68.75	67.52

A well recognized fact now suggests itself; namely, that fourteen years of school work could not fail to eliminate a large per cent of the unfit, hence the narrow variations shown by these figures for normal school seniors may not typify the ordinary school grade.

My next purpose was therefore to perform a similar set of experiments on a common school grade, and if possible to find one of wide variation, so as to see what effects the kind of presentation of subject matter could reveal with such a grade. I selected an "Eighth Grade A" in one of the large schools in New York City. The grade was made up of forty boys (the preceding tests were with females, and females are commonly believed to vary less widely than males) who had met as wide a range of vicissitudes in school as any one would care to think of, and who were believed by their teachers to "vary from considerable ability to hopelessness". The series of tests made with these students were both more extensive and more intensive than had been attempted with the normal school seniors.

In order to make a genuine test of learning abilities with the different materials, a sufficient number of successive presentations was made with the subject matter so as to enable some, at least, of the students to command all of it. By so doing it was hoped to get a more definite idea of the working ability of the students. The tests included the following series:

I. *Learning Tests, with Multiple Presentation.*

1. Learning a list of thirteen nonsense syllables (selected from the list given on page 102). Five trials were given on the list before it was certain that some students had learned the entire list.

2. Learning a poem, three trials required,—

“I see the lights of the village
 Gleam through the rain and the mist,
 And a feeling of sadness comes o'er me,
 That my soul cannot resist ;
 A feeling of sadness and longing
 That is not akin to pain,
 But resembles sorrow only
 As the mist resembles rain.”

3. Learning six historical events and dates, two trials,—

1. 1829 (Mexico freed her slaves).
2. 1763 (Mason and Dixon's Line established).
3. 1800 (National capital moved from Philadelphia to Washington).
4. 1610 (Hudson discovered Hudson Bay, and was there east adrift and lost).
5. 1855 (Opening of railroad across the Isthmus of Panama).
6. 1819 (First steam vessel crossed the Atlantic, sailing from New York).

4. Learning a list of technical terms, with meaning; two lists, one trial each,—

First List.

1. aberration (wandering).
2. entomology (study of insects).
3. regurgitate (flow back).
4. fulmination (explosion).

Second List.

1. efficacious (having desired effect).
2. malignant (very harmful).
3. hydrotropic (water-seeking).
4. defoliate (deprive of leaves).
5. geotropic (turning toward the earth).
6. effeminate (womanish and weak).

(Each term used in a sentence to give meaning.)

5. Learning a list of historical names, one trial,—

1. Abelard (French scholar).
2. Glaucus (mythical character; torn to pieces by his own horses).
3. Abimeleck (Bible king).
4. Nineveh (ancient Assyrian king).
5. Polonius (a trickster in Shakespeare).
6. Xerxes (a Persian king).

The above tests were all given on the afternoon of the last school day preceding Christmas. In the forenoon of the first school day after New Year's (and following an eleven day vacation) the following tests were made with these students:

II. Memory and Relearning Tests.

1. A memory test with no assistance whatever, to see how many of the thirteen nonsense syllables, learned eleven days before and with holiday thoughts in between, each student could now produce. Then two other tests on relearning the list of thirteen syllables under the same conditions of presentation as were used in learning the list before the holidays.

2. A memory test on the poem, with no assistance. Then two relearning tests on the poem under same condition of presentation as before.

3. A memory test on the six historical dates, with events. Then two relearning tests under the usual conditions.

In each of the preceding tests, both in learning and in relearning, the following multiple presentation was made: (1) seeing; (2) hearing; (3) seeing and reading aloud in concert; (4) seeing and copying rapidly on paper.

III. Learning Tests, with Single Presentation.

Finally, two series of three tests each, one series with visual presentation alone, and the other with auditory presentation alone, were made for the purpose of deriving standards of variation under such forms of presentation. Each of these series comprised the following tests:

1. Learning a list of four historical dates or names, with identification as before; two tests (one in each series) of one trial each,—

First Series (dates).

1. 1815 (Napoleon defeated at Waterloo).
2. 1469 (Mouth of Congo discovered).
3. 1799 (Washington died).
4. 1823 (First successful telegraph line in world, built from Baltimore to Washington, by Samuel F. B. Morse).

Second Series (names).

1. Alfonso (King of Spain).
2. Kruger (President South African Republic).
3. Fortinbras (Norman King).
4. Abiathar (Bible name).

2. Learning a list of four technical terms, with meaning, two tests (one in each series) of one trial each,—

First Series.

1. miniature (small copy).
2. orthoptera (straight winged).
3. gratuitous (without cost).
4. immanent (dwelling within).

Second Series.

1. lepidoptera (scale covered wings).
2. malfeasance (wrongdoing).
3. posthumous (occurring after death).
4. saponify (to make into soap).

(Each term was used in a sentence to give meaning.)

3. Learning a list of eight nonsense syllables, two tests (one in each series) of one trial each. (The syllables were selected from the list given on page 103.)

In deciding upon a system for marking this wide range of tests, many difficulties were encountered. It was the dominant purpose (1) to make the tests simple, yet closely following the lines of ordinary school work; and (2) to grade the tests without deviating too far from established scientific methods, yet again following closely the methods used in ordinary school work. After considerable deliberation, the following plan was adopted for marking all of the tests:

1. The right term, or fact, or meaning counted one point.
2. The right order of the term, etc., counted one point.

It may thus be seen that if two or more dates (or terms, etc.) were correctly given, but their places interchanged, they were scored one-half value. So, too, in any list, say of nonsense syllables, an omitted term was simply counted out without affecting the score of succeeding terms. To illustrate, if only three out of ten nonsense syllables were given, say the first, the fifth, and the last of the list, each syllable was scored two points if the three were in the correct order; but if the "last" syllable preceded the middle one, we may say, then each of the last two counted only one point. Students were thus not required to mark spaces for omitted terms. In no case was a part of a term counted, but each term was counted either right or wrong as a whole.

The nonsense syllable tests were later scored according to the marking system employed by Cyril Burt,⁵ which is but a slight

⁵British Journal of Psychology, Dec., 1909, page 142.

modification of the Meumann system. The purpose of this double scoring was to furnish a basis for comparison, in order to determine whether or not the simple system here used for all tests was deviating too far from the usual scientific methods. It is interesting to note here that the Cyril Burt system gave a record in general somewhat higher than that given in the accompanying table, but that in no case did it make a significant change in the variability; and variability is the important fact in these tests for the purpose in hand.

A summary of the scores for all the tests is given in the following table. The ages of these students varied from fourteen years and three months to sixteen years and ten months; average age, fifteen years and nine months. The grouping follows the plan used in the normal school table; namely, the first group (thirteen students) comprises all who reached their best results, roughly speaking, under visual presentation; the second group shows students (sixteen) who succeeded best under auditory presentation; and the third group (eleven students), those who did best under the motor presentation when it came in.

SUMMARY OF SCORES REDUCED TO PER CENT AVERAGES.

Groups.	Combined-form Presentation.						
	I. Learning.				II. Relearning.		
	Syllables.	Poem.	Dates.	Tech. Terms.	Syllables.	Poem*	Dates.
1	950 = 73%	1137 = 87%	1208 = 93%	1175 = 90%	697 = 58%	571 = 71%	848 = 71%
2	1136 = 71	1414 = 88	1488 = 93	1404 = 88	1427 = 89	405 = 68	1080 = 72
3	818 = 74	891 = 81	1048 = 95	1026 = 93	977 = 89	552 = 69	759 = 69
III. One-form Presentation.							
Visual.		Auditory.					
1	650 = 54%	501 = 42%	(*See statement on page 112 with reference to ruling out certain scores.)				
2	589 = 39	842 = 56					
3	432 = 39	462 = 42					

The following condensed table of variations reveals the significant facts of the results for our present purpose:

TABLE OF VARIATIONS. (PER CENT RECORD.)

	MULTIPLE PRESENTATION (LEARNING).					Averages.
	Score. Low. High.	Total Average.	Mean Variation	Per cent Variation		
Syllables.....	{ 1st trial 0 73	45.05	13.7	30.42		
	2nd " 27 92	64.63	16.61	25.70		
	{ 3rd " 39 100	80.60	11.89	14.74	18.39	
	{ 4th " 50 100	86.10	9.98	11.59		
	{ 5th " 43 100	87.68	8.35	9.52		
Poem.....	{ 1st trial 22 100	73.38	20.56	28.02		
	2nd " 55 100	90.83	7.92	8.72	14.15	
	{ 3rd " 71 100	93.68	5.34	5.70		10.43
Dates.....	{ 1st trial 60 100	88.30	6.60	7.47		
	{ 2nd " 92 100	98.60	2.70	2.74	5.11	
Technical terms	{ Four.... 75 100	96.25	4.34	4.51		
	{ Six..... 33 100	83.65	10.19	12.18	8.35	
Historical names. .Six.....	75 100	89.33	5.48	6.13	6.13	
SINGLE PRESENTATION (LEARNING).						
Visual...	{ Historical names 19 69	46.68	9.09	19.47		
	{ Technical terms 19 69	44.55	10.98	24.65	20.90	
	{ Non. syllables .. 25 69	40.74	7.57	18.58		19.67
Auditory	{ Historical names 31 63	48.16	8.46	17.57		
	{ Technical terms 31 69	49.76	8.73	17.54	18.44	
	{ Non, syllables .. 25 69	44.68	9.02	20.19		

GROUP VARIATIONS. (LEARNING.)
(SUMMARIES.)

Presentation.	Group 1.	Group 2.	Group 3.
Visual.....	54%	39%	39%
Auditory.....	42	56	42
Average for single form.....	48	47.5	40.5
Multiple	{ Non, syllables ..	73	74
	{ Poem.....	87	81
	{ Dates.....	93	95
	{ Technical terms.....	90	93
	{ Historical names.....	90	89
Average for multiple form.....	86.6	85.8	86.4

RELEARNING TESTS (MULTIPLE PRESENTATION).

	Score. Low.	Score. High.	Total Average.	Mean Variation	Per cent Variation	Averages.
Syllables { 1st trial.....	20	100	69.05	19.74	28.59 }	22.65
2nd "	46	100	82.71	13.81	16.70 }	
Poem... { 1st trial.....	61	100	88	6.55	7.44 }	5.77
2nd "	78	100	95.23	3.89	4.09 }	12.34
Dates... { 1st trial.....	60	100	94.08	8.08	8.59 }	8.59
2nd "	83	100	98.50	2.53	r.o. }	
ELEVEN DAY MEMORY TESTS (MULTIPLE PRESENTATION).						
Syllables.....	0	73	27.26	15.68	57.52 }	
Poem.....	0	51	25.00	13.82	55.28 }	62.46
Dates.....	0	60	18.84	14.05	74.58 }	

Criticism of the Tests.

Referring now to the first tests with the nonsense syllables, it may be noted that the per cent of variability is very high for the first two trials. This is essentially due to the fact that such work was wholly new to many of the students, while others knew how to proceed to advantage from the beginning. The same may be said of the first trial with the poem. Since the variation from this cause gradually decreased throughout the ten series of tests, it is evident that the per cent of variability in the earlier tests was relatively too high, as compared with the one-form presentation tests which were the last tests given. The one-form presentation tests were given at the point of greatest advantage in this respect. It is noteworthy that there is no evidence of fatigue in the records, and there was none in the testing. The tests began at nine a. m., and interest increased as the tests progressed.

Again, it should be noted that whenever some of the students reach a score of 100 per cent, further testing on the same material is done with less possibility of variation. At two points in the learning tests (the last trial with the six dates, and the trial with the four technical terms) the possibility of variation is seriously crippled from this cause. It was at first thought advisable to rule out the scores of the two trials mentioned, but on figuring up averages it was found that the final conclusions would not be changed if the two tests were thrown out, and since they tend to counterbalance the high variation due to inexperience in the early tests, they have been allowed to stand.

The ruling out process was resorted to, however, in two instances, (1) since the poem proved so attractive to sixteen students (mainly in the auditory group) that they thought it over during vacation, their memory and relearning records were rejected. The students had no idea that the tests were to be repeated after the holidays, and extreme care was taken to find all who had gone over the material during vacation, by giving ready commendation to all such cases. The holiday period was chosen as a good time to check this tendency. (2) The last trial in relearning the dates was ruled out for the reason that the scores were nearly all perfect, hence but little chance for variation.

For the purpose of reaching conclusions as to the relation of the kind of presentation of subject matter to capacity, we may now bring together the main results from our two tables:

CONDENSED STATISTICS (VARIATIONS).
NORMAL SCHOOL SENIORS (64 STUDENTS).

Presentation.	Per cent Variation. (Total Average.)	Summaries.	Group Presentation.		
			Average.	Mean Variation	Per cent Variation
One-form	11.42	(56.5, 63, 65)	61.5	3.33	5.42
Two-form	8.02	(71.5, 70, 76)	72.5	2.33	3.22
Three-form	7.90	(69.15, 68.75, 67.52)	68.47	1.91	.64

EIGHTH GRADE STUDENTS (40).

Presentation.	Per cent Variation. (Total Average.)	Summaries.	Group Variation.		
			Average	Mean Variation	Per cent Variation
One-form	19.67	(48, 47.5, 40.5)	45.33	3.22	7.10
Three-form	10.43	(86.6, 85.8, 86.4)	86.3	.30	.35

In whatever way we look at the statistics of the foregoing tables, the one significant fact which is ever intruding is that a class of students shows far greater variation in ability under a one-form than under a two-fold form of presentation, and least of all under that form of presentation which combines the visual, auditory, and motor responses.

Here then are the facts which bear directly upon the subject of student ability, and hence throw light on the problem of grading and promotion.

Conclusions.

1. A visual, auditory, or motor presentation alone does not do justice to half the members of a class.
2. A presentation combining any two forms is better, other things being equal, than any one-form presentation, yet it does not do justice to something like one-third of the members of a class.
3. Nothing less than a presentation combining all three of the typical responses, visual, auditory, and motor, may be said to give adequate opportunities to all members of a class.

PART III. THE UNITY OF FORMAL AND DYNAMIC ASPECTS.

We are now in position to state more definitely what the phrase, "capacity of a student," really means; and then to carry that meaning over into the serious problem of grading and promotion.

The Capacity of a Student.

We have seen that there are two essential conditions to be realized in any act of teaching; namely, (1) the learner must have a stock of personal experiences sufficient to give meaning to the given subject matter; and (2) the subject matter must be presented in such a way as to call forth and utilize these personal experiences. The capacity of the student may therefore be characterized as his stock of available personal experiences, plus a favorable presentation. A failure to meet either of these two conditions may actually reduce the student's capacity to zero in any given attempt at learning.

These two conditions, therefore, must furnish us our cues to classification. If a student appears in a class whose work requires a stock of personal experiences beyond him, that student's outlook is essentially hopeless, and reclassification is imperative. So, too, if a student is found with a stock of working experiences beyond his class, he should be promoted. The first requisite, then, in classifying any student is that we have a reasonably good knowledge of his stock of personal experiences. Ten examination questions cannot elicit this essential. Indeed, no written examination can reveal it. Such methods may tell us something, but nothing less than close personal touch with the student can reveal what is needed. The question, "What grade can this child carry?" should give place to the more appropriate question, "How can this school best serve this child?" In brief, we have relied too much upon "system".

Since we aim to classify a student on the basis of his capacity, his stock of personal experiences alone is not an infallible guide. A student may have ample personal experiences, yet work may be presented in such a way as to fail to call out those experiences. We have all seen children who do poorly under one teacher, and well under another, and perhaps it was because their capacities to do the work as offered by the two teachers actually varied. We cannot get away from the fact that the student's capacity is partly determined by the teaching, and it is this element of capacity with which this study is specifically concerned. Before a student is branded as actually incompetent to carry his grade, then, we must know whether or not he has been given a favorable opportunity to respond. The proverbial "examination" sinks into a wretched assumption here, and a close, personal relationship with the student is again our hope. The fact is, the mere designation of the place where a lesson is to be found in a book *may* be sufficient opportunity for one student; while a most careful analysis of the lesson may be required by another.

All this goes to show that the proper classification of the student is a matter far less formal than our "systems" of grading and promotion indicate. Indeed the system is but an incidental thing in the real problem, and it is a hopeful fact that as time goes on we are learning more and more to sacrifice the system for the sake of the individual. "Systems of promotion need to be fitted to individual differences in capacity, to be made more flexible, rather than to be made easier for those who now fail."⁶

Our study of the interrelation of student capacity and the favorable presentation of subject matter brings out another very common error in teaching; namely, since the teacher commonly presents subject matter in a way suggested by her own ideational type, such a presentation is probably unsuited to something like two-thirds of her class. There is no question but that this widespread practice is responsible for an alarming per cent of student failures to carry grades; and thus the problems of demotion and elimination are closely related to bad teaching.

Our profound respect for system has plunged us into still another bad practice. We have been so inclined to see the child from the standpoint of his grade, that we have actually been guilty of making him a kind of tentative specialist in the subject in which he seemed to have the least ability; that is, if he seemed to have the least ability in arithmetic, and the highest ability in

⁶Thorndike, THE PSYCHOLOGICAL CLINIC, Vol. III, pp. 256, 257.

history, we have had him spend most of his time on arithmetic and the least amount of time on history, in order to make him "carry his grade". Now, this is nothing less than a worship of the grade, or system, and it is contrary to the child's best interests, and therefore to the real purpose of the school. We are now demanding that the student be advanced by the subject, rather than by the grade, for we have seen quite enough of the lockstep evils. As ex-President Eliot has said, "We have reaped now in the public school system all the benefits of system and uniformity, and it is high time to superinduce in the American schools the opposite benefits of flexibility and variety."

It is a hopeful and significant fact that the point system⁷ of classification and promotion is now making its advent. Under this plan, however, a student should be permitted, if need be, to belong to several groups or grades at the same time. When he has gained the requisite number of points in history, he should be promoted in history, and so on, and not held back for a given number of points in each subject. His diploma should come with the required number of points. A student should move as rapidly in one subject as his ability permits, and as slowly in another subject as his capacity requires. We have begun to realize that there are no *sine qua non* subjects, for experience has shown us that individuals can and do succeed in spite of deficiencies in the old "essentials", or "three R's". Moreover, we have found that the individual may have a private road to any subject.

The fact is, broadly stated, we are living theoretically, at least, in the day of immanence. The "inner gift" is the sacred thing, and all our forces are being organized to the end of bringing out the best there is within. Education, religion, government, and all other influences, must ultimately free the ability, the potential good within. There is nothing now sacred where the inner man is not, and anything is sacred just in the degree that it receives the inner sanction. We shall hardly stop until this belief has become reality in our schools. Already a Münsterberg⁸ can say, "No learning and no training of the human mind counts, if it does not find an emotional willingness," and school methods are rapidly being remolded to conform to the interests of the individual. Not uniformity, but variety of abilities is what we are now to seek. In brief, our most serious problem is to reach the individual.

⁷The Grading and Promotion of Pupils. Ed. Rev., Vol. 40, pp 375-386.

⁸"Psychology and the Teacher," p. 263.

All this points to the fact that the old lockstep evils are being remedied in a larger way than any system of grading and promotion can reveal; but the formal step, the "military drill" aspect of grading, is soon to disappear, and "system" is going to have its control very much limited. Systems we must have, but we want less obtrusive, less dominating, and more flexible systems. No system should longer be permitted to pervert the real purposes of the school, but any system may exist as an elastic and modest means of serving the needs of the individual.

General Summary and Conclusions.

By way of summary, we may state the following conclusions:

1. The vital thing in any case of grading or promotion is personal acquaintance with the ability of the student.

2. Student ability is not a fixed and unvarying quantity, but it may be characterized as the student's stock of available personal experiences, plus a favorable presentation of subject matter.

3. Inadequate experience with the real capacities of students, together with one-sided presentations of subject matter which are suggested by the teacher's own ideational type, is responsible for many school failures, and hence adds much weight to the already heavy problem of regrading.

4. A visual, auditory, or motor presentation alone does not do justice to half the members of an ordinary class; and nothing less than a presentation favoring all three of the typical modes of response may be safely relied upon in group teaching.

5. Too much emphasis is now placed upon system, and we are not guided enough by the needs of the individual students.

6. The lockstep systems, which classify by grades, should be superseded as far as possible by classification into homogeneous groups, varying from subject to subject, so that we may have less grade dominance and more respect for individual needs and capacities.

7. Classification and promotion should be made on the basis of personal acquaintance with the abilities and needs of the student in specific subjects, rather than on the basis of the formal examination covering any or all subjects.

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NONSENSE-SYLLABLES.
(NUMERAL RECORD)

Number of Student.	Form of Presentation.								Combined Visual Auditory-Motor.
	Visual.	Auditory.	Visual and Motor.		Auditory and Motor.				
1	7 + 8 + 8 = 23	5 + 6 + 5 = 16	9 + 8 + 9 = 16		7 + 7 + 6 = 20		12 + 11 + 13 = 36		
2	6 9 9 24	6 8 7 21	8 9 10 27		7 9 7 23		14 10 13 37		
3	5 9 8 22	6 6 5 17	9 9 22 6		5 8 19		13 9 8 30		
4	9 7 6 22	7 4 5 16	7 8 5 20		9 6 21		9 8 13 30		
5	4 9 9 22	3 7 9 19	7 10 9 26		5 6 7 18		15 12 12 39		
6	3 6 8 22	7 4 7 18	9 6 8 23		6 7 8 21		14 9 12 35		
7	7 8 7 22	6 6 5 18	9 9 24 8		6 23 8 20		13 10 13 36		
8	6 7 8 21	5 6 7 19	8 9 25 5		8 7 20		12 13 12 37		
9	7 6 9 22	6 7 6 19	8 7 10 25		7 8 6 21		10 11 7 28		
10	3 7 9 19	6 5 5 16	8 7 9 24	4	3 9 16		13 6 9 28		
11	5 7 7 19	4 6 3 12	6 6 16 3		5 8 19		12 11 11 34		
12	4 4 6 14	5 5 3 12	5 6 7 15		7 15		9 10 8 27		
13	9 6 5 20	6 7 5 18	7 8 23 5		8 19		11 8 12 31		
14	8 5 8 21	5 5 7 18	8 7 9 24	5	8 21		14 11 11 36		
15	6 5 8 19	6 5 15	8 6 18 7		6 6 19		10 7 9 26		
16	7 9 7 23	5 7 6 18	8 10 25 6		7 8 21		14 12 11 37		
17	8 8 7 23	6 7 6 19	8 9 26 6		7 6 21		14 10 13 37		
18	7 6 8 21	5 8 6 19	5 9 23 6		6 8 20		13 9 14 36		
19	8 7 7 22	6 5 5 18	7 9 23 6		6 8 20		12 11 12 35		
20	7 7 9 24	8 6 6 20	8 8 9 25	8	7 7 22		14 13 12 39		
21	6 8 7 21	5 5 5 17	8 7 8 23	5	8 20		13 9 9 31		
22	7 5 9 21	7 7 6 20	8 7 8 23	8	6 21		12 13 11 36		
23	8 7 7 22	9 5 4 18	7 8 9 24	8	6 20		14 8 9 31		
24	7 6 7 20	6 6 18	7 8 6 21	6	8 21		11 7 12 30		
25	8 5 8 21	7 6 6 20	8 7 8 23	5	8 20		10 12 6 28		
26	7 6 6 19	5 5 6 16	8 7 8 23	7	6 17		12 12 10 34		
	*549		461		603		518		863
27	4 5 4 13	8 7 22	5 6 5 16	7 9 8 24		12 11 9 32			
28	5 8 7 20	7 8 22	7 5 5 19	8 8 24		10 10 12 32			
29	7 4 6 17	6 8 22	7 7 5 19	7 8 24		13 9 11 33			
30	6 6 3 15	4 7 8 19	6 7 6 19	7 6 21		11 11 12 34			
31	7 4 6 17	6 8 22	6 7 8 21	8 6 22		13 9 12 34			
32	3 6 6 15	7 8 21	5 6 6 17	8 7 21		12 12 9 33			
33	5 7 6 18	8 7 22	6 8 6 17	8 7 21		13 10 11 34			
34	6 5 7 18	7 8 22	5 7 7 19	8 8 24		11 8 12 31			
35	5 6 4 15	7 8 22	6 8 5 19	7 8 24		13 11 7 31			
36	7 4 5 16	6 7 20	5 7 8 20	8 7 23		9 8 14 31			
37	9 5 5 19	7 8 22	6 8 7 21	8 9 24		12 12 13 37			
38	7 6 3 16	8 7 21	7 5 6 17	9 8 23		12 11 10 33			
39	6 5 6 17	7 7 21	6 6 6 20	9 7 22		11 9 12 32			
40	4 5 6 16	8 5 21	7 5 7 19	8 5 21		8 11 12 31			
41	5 5 7 17	7 6 21	6 6 8 20	8 9 24		13 10 11 34			
42	7 6 6 19	6 8 21	4 9 8 21	7 9 24		14 9 9 32			
43	6 8 8 16	6 19	6 19 7 21	8 9 23		12 13 10 35			
44	6 5 7 18	8 5 20	5 7 20 6	5 19 7		12 11 10 33			
45	5 5 5 15	8 9 22	5 22 6 17	8 6 22		13 14 8 35			
46	6 7 5 18	7 5 19	7 6 6 19	8 7 23		11 12 12 35			
47	4 7 7 18	7 8 23	7 7 6 20	7 9 23		11 9 11 31			
	**353		442		403		480		693
48	5 5 6 16	7 4 17	6 17 8 22	7 9 25		12 12 11 35			
49	4 7 5 16	3 5 17	9 8 22	6 8 23		13 10 13 36			
50	7 3 4 14	6 5 17	8 7 21	8 6 23		9 9 7 25			
51	5 4 5 14	5 6 15	7 6 15 8	21 8		9 10 11 30			
52	4 6 5 15	6 4 15	5 15 7 7	8 22		10 11 13 34			
53	7 5 6 18	6 7 19	9 7 7 23	8 8 25		13 11 9 33			
54	5 6 6 17	7 8 19	4 19 6 7	9 22 8		12 13 12 37			
55	6 4 8 18	5 7 18	6 18 7 8	23 8		11 9 10 30			
56	5 8 4 17	6 8 19	5 19 6 8	23 9		12 11 6 29			
57	7 6 7 20	5 8 20	7 20 9 8	25 8		11 12 11 34			
58	6 4 4 14	5 7 16	4 16 7 7	21 8		10 9 12 31			
59	5 6 6 17	5 7 19	19 7 8	23 9		13 12 8 33			
60	6 4 8 18	4 6 16	8 9 6 23	8 7 23		12 10 13 35			
61	6 4 6 16	5 6 17	7 18 7 7	21 6		11 9 7 27			
62	7 5 5 17	4 6 18	8 18 7 8	21 7		12 8 14 34			
63	7 2 2 17	8 17 7	6 18 7 8	22 7		11 12 14 37			
64	6 5 4 15	6 6 17	5 17 6 6	20 8		11 12 12 31			
	***279		296		378		397		551

COMBINED-FORM PRESENTATION.

	LEARNING.										Historical names (6).					
	Syllables (13).					Poem.			Dates (6).		Tech. Terms.					
	1st.	2nd.	3rd.	4th.	5th.	1st.	2nd.	3rd.	Average.	1st.	2nd.	Average.	4	6	Average.	
1	39	54	85	92	96	73	94	97	97	96	92	100	100+100=100	100	92	92
2	39	62	62	77	77	63	90	94	94	93	92	100	100	92	96	100
3	73	88	88	92	92	87	90	92	92	91	67	100	84	96	92	94
4	58	62	92	96	92	80	88	100	92	93	100	100	92	75	84	92
5	15	35	85	88	96	64	22	67	71	53	75	92	84	94	50	72
6	58	70	73	73	92	73	97	97	97	97	92	100	96	100	100	92
7	46	54	77	100	100	75	94	100	100	98	83	100	92	100	92	96
8	54	92	96	100	100	88	94	97	97	96	92	100	96	100	92	92
9	27	39	81	58	70	55	28	92	92	71	75	92	84	83	75	79
10	54	92	92	92	85	83	80	100	100	93	100	100	100	94	83	89
11	39	35	46	73	88	56	94	90	90	91	92	100	96	100	92	96
12	54	73	92	92	88	80	90	97	88	92	83	100	92	94	88	91
13	35	77	85	81	88	73	33	81	88	73	83	100	92	88	75	82
	*950					1137						1208			1175	1169
14	23	39	92	88	96	68	100	97	100	99	92	100	96	94	83	89
15	62	88	100	96	92	88	65	86	97	83	92	92	92	100	88	94
16	54	81	96	100	100	86	100	100	100	100	92	92	92	100	92	96
17	70	85	77	77	88	79	100	100	100	100	92	100	96	100	67	84
18	19	54	85	81	81	64	40	97	97	78	75	92	84	100	42	71
19	58	46	100	96	100	80	47	94	97	79	92	100	96	100	92	96
20	39	70	77	81	88	71	92	94	94	93	92	100	96	100	92	96
21	73	88	92	96	88	87	90	94	94	93	92	100	96	100	100	75
22	35	62	81	70	70	63	57	55	83	65	60	92	76	75	33	54
23	23	54	39	70	58	49	65	80	80	75	92	100	96	94	63	79
24	39	43	39	85	77	57	94	97	100	97	83	100	92	100	92	96
25	46	43	70	96	96	70	67	90	92	83	83	100	92	88	75	82
26	39	54	81	81	85	68	90	100	100	97	92	100	96	94	83	89
27	62	88	92	92	92	85	100	100	100	100	100	100	100	100	92	96
28	27	39	58	70	43	47	55	61	86	67	83	100	92	88	83	86
29	43	43	96	94	94	74	90	97	97	95	92	100	96	100	92	96
	**1136					1414						1488			1404	1427
30	23	54	85	96	100	72	73	90	94	79	92	100	96	100	92	96
31	0	27	46	96	88	49	35	67	97	66	83	100	92	100	83	92
32	39	77	85	100	100	80	35	94	97	75	92	100	96	100	100	92
33	46	92	96	92	85	82	65	90	92	82	92	100	96	94	83	89
34	54	88	85	88	92	81	88	100	92	93	92	100	96	100	92	96
35	39	85	81	50	77	66	43	86	86	68	83	100	92	94	83	89
36	62	70	77	88	92	78	97	100	100	99	92	100	96	100	92	96
37	62	70	96	96	96	84	43	90	90	74	100	100	100	83	92	100
38	54	62	70	66	77	66	70	90	97	86	92	100	96	100	92	96
39	62	77	81	85	92	79	73	94	90	86	92	100	96	94	88	91
40	58	73	96	100	96	81	67	86	97	83	92	92	94	83	89	92
	***818					891						1048			1026	977

(1-13)	—*950 = 73%	1137 = 87%
(14-29)	—**1136 = 71%	1414 = 88%
(30-40)	—***818 = 74%	891 = 81%
		1048 = 95%
		SUM AVERAGE
		1169 = 90%
		1427 = 88%
		977 = 93%

AND RELEARNING TESTS.

. RECORD)

RELEARNING.												ONE-FORM PRESENTATION.						
Syllables (13).				Poem.				Dates (6).				Visual.			Auditory.			
1st.	2nd.	3rd.	Average.	1st.	2nd.	3rd.	Average.	1st.	2nd.	3rd.	Average.	Historical names (4).	Technical terms (4).	Nonsense syll's (8).	Historical names (4).	Technical terms (4).	Nonsense syll's (8).	
27	+	35	+ 81 = 48	27	+	97	+ 97 = 74	13 + 100 + 100 = 71	63 + 56 + 31 = 50	44 + 50 + 38 = 41								
15	46	62	41	34	88	94	72	42 100 100 81	56 63 50	38 44	38 44							
50	85	100	78	51	80	100	77	0 100 92 64	56 63 44	50 38	44 44							
20	50	58	43	*94	100	100		17 100 100 72	69 63 56	38 44	50 41							
23	96	100	73	25	83	100	67	8 100 100 69	50 56	44 50	44 38	38 40						
73	100	100	91	*100	100	100		60 100 100 87	56 63 31	50	31 44	31 33						
0	92	100	64	*100	100	100		4 100 100 68	63 56	56 56	44 38	38 40						
23	73	92	63	*92	97	97		50 67 100 79	56 63 69	63	31 44	50 42						
8	35	70	38	51	92	97	80	6 92 92 63	63 56	25 48	50 38	31 40						
0	62	77	46	0	100	97	66	0 83 92 58	63 69	31 54	44 38	50 44						
8	77	88	58	34	92	97	74	4 100 100 68	56 63	31 50	63 38	25 42						
15	70	77	54	4	86	94	61	4 100 100 68	56 56	50	38	50	50	46				
absent				571				848				650			501			
			697															
40	96	100	79	*97	100	100		33 100 100 78	50 44	31 42	63 63	56 61						
40	85	100	75	*83	100	100		60 100 100 87	50 44	44 46	63 69	63 65						
43	77	100	73	*100	100	100		21 100 100 74	50 38	50 44	56 63	69 63						
31	88	92	70	*100	100	100		4 92 100 65	44 50	38 44	56 56	50 54						
0	40	58	33	14	97	100	70	2 92 100 65	31 44	38 38	56 56	50 56						
40	54	46	47	20	97	100	72	8 100 100 69	38 44	44 42	56 44	63 53						
absent																		
40	88	96	75	*83	100	100		4 100 100 68	44 38	31 38	50 63	50 54						
8	62	77	49	27	78	94	66	30 100 100 77	41 19	38 34	50 56	56 54						
15	35	62	37	29	90	97	72	50 100 100 83	38 31	31 33	56 50	38 48						
43	58	85	62	*97	100	100		16 100 100 72	25 31	38 31	56 63	50 56						
8	88	100	65	0	90	94	61	0 67 100 56	44 25	44 38	63 69	44 56						
20	88	85	64	*94	97	100		25 81 100 69	38 38	38 38	56 50	50 52						
46	96	96	79	*92	100	100		0 100 100 67	50 44	44 46	56 63	56 58						
23	35	46	35	34	80	78	64	16 100 100 72	38 50	25 38	63 69	31 54						
43	92	92	76	*97	100	100		33 100 100 78	56 25	31 37	63 63	38 55						
			919					405			1080		589			842		
40	100	100	80	*67	100	100		12 92 100 68	38 44	44 42	44 50	44 46						
0	20	50	23	0	61	83	48	16 100 100 72	19 31	38 29	25 31	38 31						
62	70	92	75	27	88	97	71	25 100 100 75	44 38	38 40	38 63	31 44						
35	92	96	74	51	94	97	81	8 60 100 56	50 31	44 42	38 44	50 44						
20	46	77	48	51	88	100	80	16 100 100 72	44 31	50 38	44 44	44 44						
40	58	81	60	34	94	97	75	33 100 100 78	44 38	44 42	44 44	44 44						
46	88	88	74	*97	100	100		60 92 100 84	44 25	38 36	50 44	31 42						
50	88	92	77	*83	100	100		16 100 92 69	44 31	56 44	50 38	50 46						
26	43	62	44	0	97	100	66	0 100 100 67	31 44	50 42	44 56	31 44						
0	62	77	46	10	86	94	67	4 83 83 57	31 38	44 38	44 38	44 42						
15	54	88	52	27	78	88	64	16 75 92 61	38 31	31 33	31 50	31 37						
			653					552			759		432			462		

11

$$\begin{array}{ll} 697 = 58\% & 571 = 71\% \\ 919 = 61\% & 405 = 68\% \\ 653 = 59\% & 552 = 69\% \end{array}$$

$$\begin{array}{l} 848 = 71\% \\ 1080 = 72\% \\ 759 = 69\% \end{array}$$

$$\begin{aligned}650 &= 54\% \\589 &= 39\% \\432 &= 39\%\end{aligned}$$

$$\begin{array}{r} 501 = 42\% \\ 842 = 56\% \\ 462 = 42\% \end{array}$$

* Thought poem over since learning, and record rejected.



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